WHAT IS THE ROLE OF THE JOINT FORCES AIR COMPONENT COMMANDER AS AIRSPACE CONTROL AUTHORITY DURING STABILITY OPERATIONS?

A thesis presented to the Faculty of the US Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE
Strategy

by

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Fort Leavenworth, Kansas
2007

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
15-06-07	Master's Thesis	Aug 2006 - Jun 2007

4. Title And Subtitle
What Is The Role Of The Joint Forces Air Component Commander

As Airspace Control Authority During Stability Operations?

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
Gallei, Francisco M., Major

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

U.S. Army Command and General Staff College
ATTN: ATZL-SWD-GD
1 Reynolds Ave.
Ft. Leavenworth, KS 66027-1352

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

Airspace control is not a new concept and there has been considerable doctrinal development and discussion over the last 50 years. However, the role the joint forces air component commander as the airspace control authority during stability operations has not been explored. Airspace control has become increasingly complex due to the increase of unmanned aerial vehicles in use by the Army and other services. Differences in airspace control capability, the lack airspace control equipment, doctrine, joint training and common systems increase the difficulties for the joint forces air component commander to function as airspace control authority during stability operations. This analysis highlights the robust air control system employed during stability operations (counterinsurgency) in South Vietnam, but was not available for Operation ENDURING FREEDOM and for Operation IRAQI FREEDOM after major combat operations ended and stability operations began. This study specifically highlights the lack of certain items of air control equipment, airspace control doctrine for stability operations, common systems, and robust joint training and offers recommendations for improving joint capabilities and doctrine.

15. SUBJECT TERMS
Stability Operations, Airspace Control Authority, Joint Forces Air Component Commander, Khe Sanh, Fallujah, airspace control

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER *(include area code)*
Unclassified	Unclassified	Unclassified	UU	104	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

MASTER OF MILITARY ART AND SCIENCE
THESIS APPROVAL PAGE

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the US Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

WHAT IS THE ROLE OF THE JOINT FORCES AIR COMPONENT COMMANDER AS AIRSPACE CONTROL AUTHORITY DURING STABILITY OPERATIONS?, by Major Francisco M. Gallei, 97 pages.

Airspace control is not a new concept and there has been considerable doctrinal development and discussion over the last 50 years. However, the role the joint forces air component commander as the airspace control authority during stability operations has not been explored. Airspace control has become increasingly complex due to the increase of unmanned aerial vehicles in use by the Army and other services. Differences in airspace control capability, the lack airspace control equipment, doctrine, joint training and common systems increase the difficulties for the joint forces air component commander to function as airspace control authority during stability operations. This analysis highlights the robust air control system employed during stability operations (counterinsurgency) in South Vietnam, but was not available for Operation Enduring Freedom and for Operation Iraqi Freedom after major combat operations ended and stability operations began. This study specifically highlights the lack of certain items of air control equipment, airspace control doctrine for stability operations, common systems, and robust joint training and offers recommendations for improving joint capabilities and doctrine.

ACKNOWLEDGMENTS

A special thank you is extended to the members of my thesis committee. Dr. James Corum, for providing me the framework for the thesis layout, quick turnarounds on my chapters, an Army perspective, historical expertise, and the possible ways to approach this thesis. Colonel Neuenswander of the Air Force element at Fort Leavenworth for providing the idea for the thesis, inspiration and expert knowledge with regards to doctrine, and the latest joint issues regarding airspace control. Lieutenant Colonel Jones, Marine Corps, for his patience, encouragement, expertise, and perspective on this issue. The author expresses sincere appreciation to the committee for making this thesis a learning and worthwhile experience.

The most special thank you is for my wife, Susanne, for her patience, never-ending support, encouragement, and love.

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CHAPTER 1

INTRODUCTION

Background

Operations Enduring Freedom and Iraqi Freedom highlight the growing complexity of airspace control; especially during stability operations. In the past, airspace management focused on major combat operations while airspace management in support of other operations, such as stability operations, simply flowed from the same techniques and procedures used during major combat operations. These past experiences involved operations, such as Desert Storm, where there was not a US presence inside Iraq, and the US Air Force enforced a no-fly-zone. These past experiences also included an air war over Kosovo followed by the entry of ground troops involving no significant resistance from the local populace. Humanitarian operations, such as in Indonesia in 2005, occurred in a relatively benign environment. These operations had relatively few American forces on the ground, much less forces where unmanned aerial systems have proliferated down to the platoon level. Due to the lack of an operation requiring ground and airpower to operate in a hostile environment and synchronize efforts, there was no urgent need for the services to work through problems related to aircraft from all services operating in the same airspace. As the US Army developed unmanned aerial systems for long-range intelligence, surveillance, reconnaissance (ISR), as well as for small unit support, current procedures and doctrine may not be sufficient to deal with an ever increasingly saturated airspace.

During major combat operations (MCOs), a theaterwide command and control system is usually in place. During stability operations (SOs) these systems must also be

in place, but many elements that may be needed are sometimes not available. The equipment or trained personnel are not available to provide the appropriate command and control needed in stability operations, or the doctrine within and between the services is not available to govern airspace control during stability operations. Equipment may not be available because it was sent home from theater after major combat operations, such as with the E-3 AWACS after Operation Iraqi Freedom, in order to reconstitute a wing that had been constantly deployed since August 1990. Finally, equipment may not be available because the services have not put existing technology into use. Although the USAF usually has the preponderance of air assets and possesses the command and control capabilities required to provide command and control over the entire theater, it is essential that the other services have the ability to integrate into this theaterwide command and control network. The procedures for controlling and passing air assets between sectors must be standardized. Air Force Doctrine Document (AFDD) 2-1.7 states that "Centralized tasking and allocation of resources is accompanied by progressive decentralization of task execution to the lowest command echelon capable. In centralized control, authority may be progressively delegated to subordinate echelons."[1] This same principle should also apply to airspace control.[2] By delegating to the lowest echelon capable of providing both positive and procedural airspace control, as appropriate to the situation, tactical flexibility is maximized. Currently only the Air Force, Marine Corps, and Navy can provide both positive and procedural control. The Army currently does not have this capability.

Traditionally, the services with the exception of the Army have controlled their aviation assets using a combination of positive and procedural control. Procedural control

has worked well during major combat operations because the airspace control authority could create a line dividing the airspace either vertically or horizontally. This tended to work relatively well because most major combat operations usually take place on a linear battlefield where ground forces advance along phase lines. Air and ground forces use fire support coordination measures to separate the battlefield, allowing for the physical separation of aviation assets giving freedom of operation without having to always coordinate prior to applying fires. However, fire support coordination measures tend to hide major issues regarding airspace control. Traditionally, the services used the fire support coordination line, a type of fire support coordination measure, to delineate areas where the Air Force can freely operate its assets and where the Army can employee its aviation assets, Army Tactical Missile System (ATACMS) and Multiple Launch Rocket System (MLRS). An enduring issue of contention between the services, especially between the Air Force and Army, is where the fire support coordination line is drawn. The Army prefers the fire support coordination line as far forward from the forward line of troops as possible to allow it to use its own aviation assets, such as attack helicopters and ATACMS, to destroy the enemy and minimize coordination of joint fires. On the other hand, the Air Force wants the fire support coordination line to be in as close to the forward line of troops as possible which would allow interdiction of more targets without having to coordinate with the Army. These issues came to the fore after years of doctrinal debate during Desert Storm. For example, during Desert Storm there were several instances where the Army and Air Force disagreed where the fire support coordination line should be located. One such instance involves the Army moving the fire support coordination line approximately five miles north of the Euphrates River because it

wanted to fly some helicopters and not have to worry about being bombed by the Air Force. “In practice there were problems integrating efforts on the battlefield by all components. Services were at times conducting operations and significant movements without coordinating with the other services.”[3] These instances are examples of the fire support coordination line serving as a measure to deconflict forces and allow each service to operate with little coordination between the two.

Another fire support coordination measure used between the Air Force and the Army to provide deconfliction and freedom of movement for both air and ground forces is the coordinating altitude. This altitude is set in the airspace control order and the airspace control plan and “is a procedural airspace control method used to separate fixed- and rotary-wing aircraft. This method determines an altitude below which fixed-wing aircraft will normally not fly and above which rotary wing aircraft normally will not fly. The coordinating altitude is normally specified in the airspace control order and may include a buffer zone for small altitude deviations.”[4] If aircraft need to transit below the coordinating altitude it must get approval from the controlling sector. The same procedures apply for aircraft needing to go above the coordinating altitude; it must contact the unit controlling that particular sector (Figure 1).

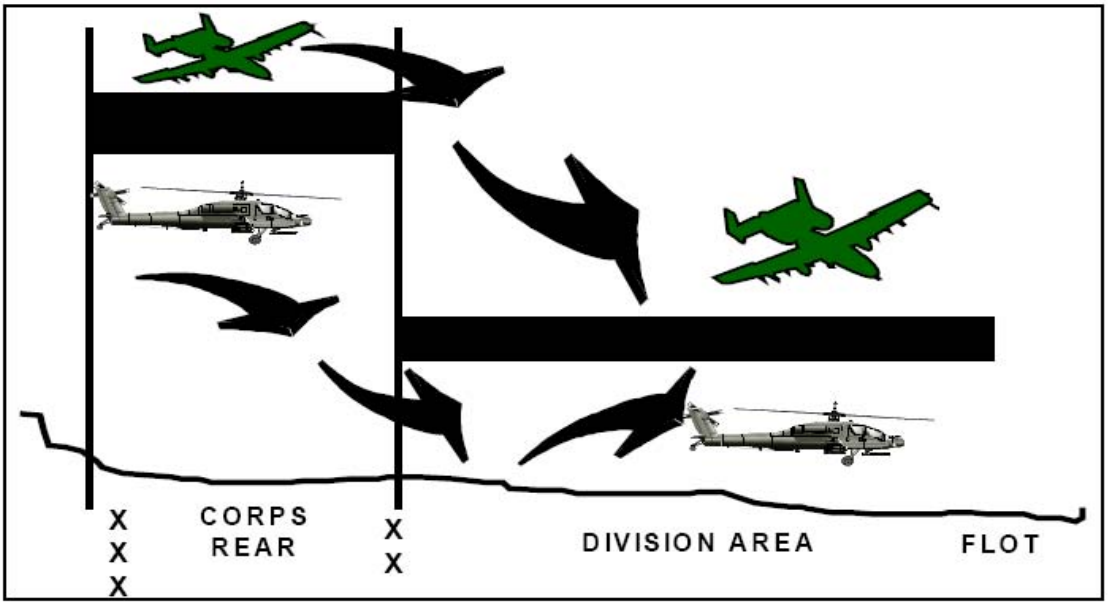

Figure 1. Coordinating Altitude Depiction
Source: Headquarters, Department of the Army. FM 3-52, *Army Airspace Command and Control in a Combat Zone* (Washington, DC: August 2002), 4-3.

Kill boxes are another measure used to separate or divide the battlespace (Figure 2). "A kill box is a three-dimensional fire support coordinating measure (FSCM) used to facilitate the expeditious air-to-surface lethal attack of targets, which may be augmented by or integrated with surface-to-surface indirect fires."[5] Its purpose is to allow air assets to conduct operations without coordinating with the ground commander or with terminal attack controllers. Kill boxes can be used to augment other fire support coordination measures to focus air and indirect fire assets. An example is the establishment of kill boxes short of the fire support coordination line "to eliminate the coordination required by air assets when striking interdiction targets to support the land component's concept of operations."[6] Kill boxes can also contain other fire support coordination measures within its confines.[7] They are a useful fire support coordination measures used during stability

operations to focus air and indirect fire assets. They should not be used to simply separate Air Force and Army airspace sectors. Currently the services are working on joint tactics, techniques and procedures that focus on kill boxes during stability operations.

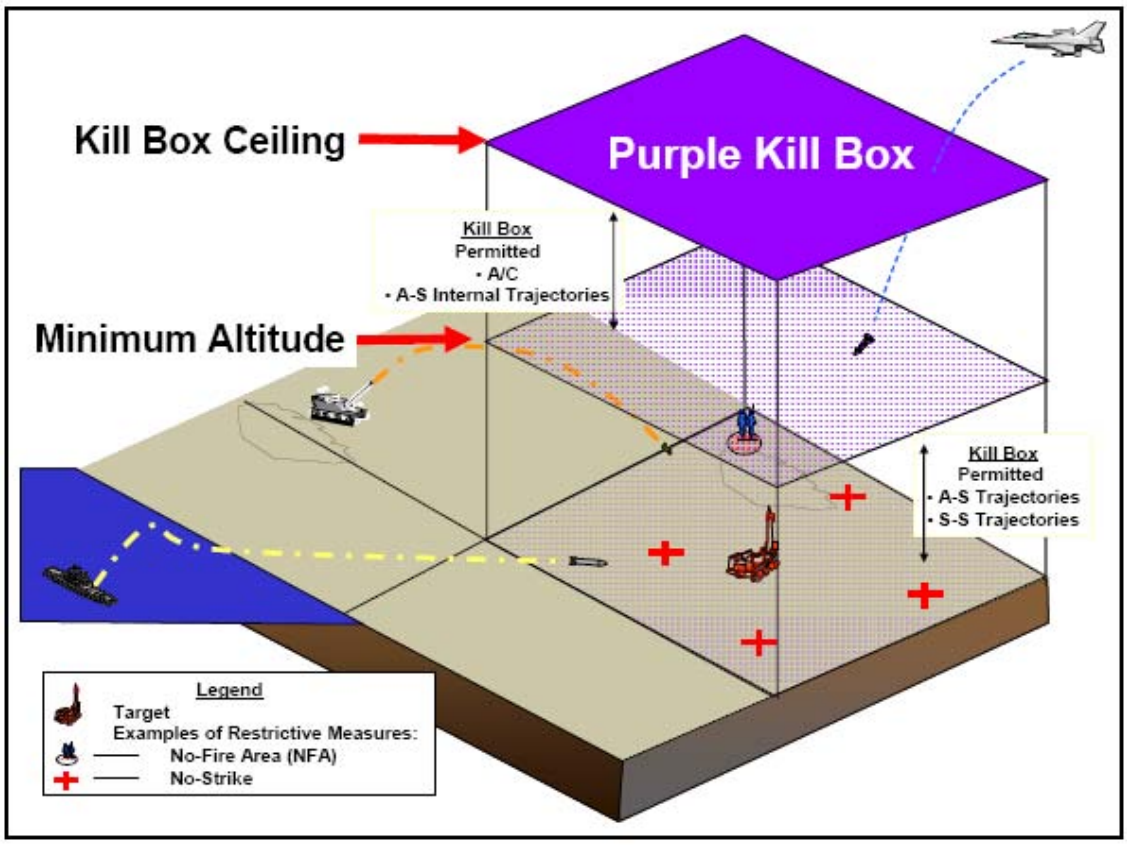

Figure 2. Purple Kill Box
Source: Air Land Sea Application Center, *Multi-Service Tactics, Techniques, and Procedures for Kill Box Employment* (Langley Air Force Base, VA: June 2005), II-5.

Although these major fire support coordination measures function well during major combat operations once their specific placement are agreed upon, these measures do not really solve the problem of airspace control between various control agencies during stability operations. In a nonlinear operating environment, such as in stability

operations, these fire support coordination measures may not viably be the only method to deconflict aircraft. As the Army operates unmanned aerial vehicles at higher and higher altitudes, it has advocated pushing the coordinating altitude to levels that could pose a problem to fixed-wing aircraft conducting close air support. According to the Army, leaving the coordinating altitude at lower levels would hamper its ability to effectively operate unmanned aerial vehicles. But, having the coordinating altitude higher would also require the Army to have the ability to positively or procedurally control all aviation assets in their airspace control sector to provide deconfliction to fixed wing aircraft or those transiting through the sector to another sector. Currently the Army does not have the ability to positively control aviation assets; but it are working to that end. These issues are important to the joint forces air component commander as airspace control authority during stability operations because the capability to control airspace drives airspace control plan and airspace control order development and execution.

Stability operations require extremely close coordination of airpower. During major combat operations, airpower and ground power have generally been deconflicted from one another enough to prevent a true air-ground system from emerging. Much as the Route Package system in Vietnam divided the application of airpower, fire support coordination measures can also artificially divide the battlefield. The Route Package system geographically separated Vietnam into seven different routes, Route Package I-VI-A and VIB.[8] During stability operations these measures are not very useful due to the nonlinear nature of the battlespace. This nonlinearity creates an environment where airpower and ground forces must work in concert, in real time, in order to effectively use

airpower in support of ground forces conducting stability operations and avoid civil aviation.

Joint Publication (JP) 3-52, *Joint Doctrine for Airspace Control in the Combat Zone*, states, "Close coordination is required to deconflict airspace use with the employment of joint fires."[9] Fire support coordination measures and air control measures are used to assist in this deconfliction. Many of these fire support coordination measures are highly effective in a linear battlespace and do not necessarily require the positive control of aircraft. These same measures may not necessarily apply during stability operations and may require other measures coupled with the ability to provide positive and procedural control. This combination provides the maximum flexibility to airspace control procedures.[10]

Thesis Importance

This work hopes to contribute to the current discussion of Air Force and Army doctrine being carried out at the Air Force Doctrine Center and the Army Center for Airspace Doctrine. The Air Force, Marine Corps, and Navy have the equipment and training necessary to positively control aircraft inside an airspace control sector while the Army lacks this capability due to the lack of equipment, training, and doctrine. The Army controls its aviation assets below the coordinating altitude using procedural control. Positive and procedural control is discussed in chapter 2. Current doctrine addresses airspace control during major combat operations, but does not address the issues of airspace control during stability operations. The lack of Army capability, in terms of equipment and trained personnel, make the issue of airspace control during stability

operations more complicated and difficult to sustain in today's current operating environment.

Thesis Intent and Primary Research Question

The primary research question of this work is, What is the role of the joint forces air component commander (JFACC) as airspace control authority during stability operations? Is the JFACC's role as airspace control authority different in stability operations than in major combat operations? If so, what needs to be addressed to ensure the JFACC has the appropriate tools across service lines in terms of doctrine, training, and equipment of forces to effectively function as airspace control authority? Secondary questions include: What is the history of the JFACC's role during past stability operations? What has been the air component's role during past counterinsurgencies? What airspace control issues exist during major combat operations that may not exist during stability operations and vise versa? What tools from all services (equipment and personnel) and processes are necessary for the JFACC to function as an airspace control authority during stability operations? And how has unmanned aerial vehicle proliferation affected the JFACC during stability operations and how is this likely to affect future operations?

Assumptions

The main assumption is current doctrine does not provide the necessary guidance for joint forces to operate coherently and in close coordination to maximize the effects of all weapons, not just aerial weapons, in order to protect American lives during stability operations. Therefore, current doctrine may need revision to clearly define what

procedures will be used, what existing or new equipment will be required, and possibly what type of training will be necessary. As noted, current joint doctrine regarding airspace control focuses on major combat operations and makes no significant mention of airspace control during stability operations. Past operations can provide valuable insight into developing this doctrine. Additionally, joint doctrine establishes that the JFACC can come from any service, but generally it has been from the Air Force due to the preponderance of aircraft, ability to command and control, and expertise in establishing airspace procedures. A final assumption is that the proliferation of unmanned aerial vehicles under Army, Marine Corps, and Navy control, pose a real threat to friendly aircraft in support of ground forces because many unmanned aerial vehicles cannot be tracked via radar or other electronic means. This lack of situational awareness of unmanned aerial vehicles can be a kink in the "armor" that an enemy can exploit. These assumptions will help answer the question of what role should the JFACC assume during stability operations.

Definitions

To start with, key terms must be defined. Stability operations and major combat operations, two central terms, will need to be defined in order to provide a starting reference and definition of the environment. JP 1-02 defines stability operations as "an overarching term encompassing various military missions, tasks, and activities conducted outside the United States in coordination with other instruments of national power to maintain or reestablish a safe and secure environment, provide essential governmental services, emergency infrastructure reconstruction, and humanitarian relief."[11] Stability operations also include peace operations, such as peacekeeping and peace enforcement,

missions such as counterterrorism, counterdrug, and counterinsurgency (i.e., foreign internal defense). Stability operations are also referred to as "Phase IV" or "postconflict" operations.[12] JP 1-02 does not define major combat operations or combat operations. For the purposes of this document major combat operations is defined as military operations involving the use of major combat forces against major enemy combat forces. Military Operations Other Than War (MOOTW) is the term that is still listed in many joint publications even though the term is no longer used. MOOTW throughout this document is used interchangeably with Stability Operations.

JP 1-02 defines the joint forces air component commander as "the commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for making recommendations on the proper employment of assigned, attached, and/or made available for tasking air forces; planning and coordinating air operations; or accomplishing such operational missions as may be assigned. The joint force air component commander is given the authority necessary to accomplish missions and tasks assigned by the establishing commander."[13] The airspace control authority is "the commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area."[14] Procedural and positive control is defined and explained in chapter 2.

Limitations

There are several limits to the scope of this thesis. First, it will not describe the history of the JFACC or the detailed history of conflict between the services over airspace control. Second, this is not a general examination of stability operations or major combat operations. Third, it will not examine the history of the proliferation of unmanned

aerial vehicles. This thesis will focus closely on the joint forces air component commander's role as airspace control authority during stability operations: how the airspace should be controlled; what equipment, training, and processes are necessary to ensure control, and how unmanned aerial vehicles are affecting airspace control during stability operations. Discussion of past operations will only focus on the processes of airspace control: what procedures, training, and equipment were necessary to accomplish the task.

Literature Review

The JFACC's role during stability operations is a subject that has been studied in depth although almost exclusively in the context of the development of the "single air manager" concept and during major combat operations. The JFACC's role during stability operations, and especially as ACA, has not been explored in depth. There are numerous works that discuss the JFACC, airpower in stability operations, such as counterinsurgencies, and airpower in major combat operations. Joint and service publications discuss airspace control during major combat operations and briefly discuss airspace control during stability operations. Official service histories discuss the role of airpower during Vietnam, but do not discuss these histories in the context of airspace control doctrine, equipment, and training. Literature on airspace control affecting the JFACC as ACA during current stability operations in Iraq and Afghanistan is beginning to emerge among the services.

The single best source for information on the JFACC as ACA can be found in joint and service publications. Although these publications discuss airspace control in depth, they discuss airspace control during stability operations in much less detail. Is this

because procedures and thus doctrine are the same for stability operations as they are for major combat operations? An in-depth review of joint and service airspace control doctrine is discussed in chapter 2 and analyzed in chapter 5.

In his seminal two volume work entitled, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force,* Robert Futrell provides an excellent overview of Air Force thinking. The two volumes provide a chronological evolution. He provides detailed information on the interservice struggles and rivalries with regard to the "single air manager," and airspace control. The evolution of the air control system is provided, but in much less detail with most of the effort in the field of air-to-air control. His book *Aces and Aerial Victories* is a detailed examination of the air-to-air engagements during the Vietnam War. It provides insight into the initial developments of airborne radar systems for airspace control.

Two excellent works on Khe Sanh are Nalty's *Air Power and the Fight for Khe Sanh* and the Marine Corps' Historical Branch work by Shore entitled *The Battle for Khe Sanh*. These two works provide detailed insight into the battle, the role of airpower, interservice rivalries, and aircraft control. What is not discussed in these two works that is relevant to the primary thesis question is what this information tell about the role of the JFACC or a "single air manager" as airspace control authority in a stability operations environment.

John Schlight's work, *The War in South Vietnam: The Years of the Offensive 1965-1968,* part of the Official Air Force History, is an excellent source. It discusses all major operations, the tactical air control system in some detail, interservice rivalry, and the evolution of Air Force air-to-ground capabilities. Like other major works discussed, it

does not tie these concepts into the role of the JFACC as airspace control authority in stability operations.

As is clearly seen, there is a plethora of information on the various topics relating to the JFACC's role as airspace control authority, but none is a complete synthesis of the doctrine, equipment, and training required for stability operations.

Methodology

In order to keep this work manageable and to best deal with current problems, this thesis will attempt to use the current situation in Iraq as the primary research base for stability operations and then to compare Iraq with major combat operations and stability operations during the Vietnam War due to the manner in which the airspace was divided. The Vietnam War can illustrate how airpower was controlled and how that airpower was applied against both conventional and guerrilla forces. Using Iraq and Vietnam as the main examples provides a strong database concerning what doctrine, training, and equipment might best be applied.

Chapter 1 addresses the issue of this thesis and why it was undertaken. A broad brush background into airspace control measures highlights how various fire support coordination methods that are useful during major combat operations and compensate for a lack of positive control from all services at various times during operations may not be as useful during stability operations due to the nonlinear battlespace in which US forces operate. Next, the primary and secondary research questions, assumptions, and limitations placed on the thesis are examined. Chapter 2 follows with a background and review of current joint and service doctrine on airspace control and the equipment employed. An examination of specific airspace control issues the JFACC may encounter

during stability operations is discussed. Chapter 3 is an examination of airspace control operations during the Vietnam War while chapter 4 examines airspace control operations in today's (2001-2006) current operating environment in Iraq. Chapter 5 is the conclusion, a synthesis of the material. The thesis analysis whether current doctrine, equipment, training, and processes are adequate for the role of airspace control during stability operations. This synthesis in turn will determine what the role of the JFACC as ACA is during stability operations.

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[10]Ibid., I-3.

[11]Joint Chiefs of Staff, Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms* (Washington DC., 12 Apr 2001, as amended through 16 Oct 2006), 506 [document on-line]; available from http://www.dtic.mil/doctrine/jel/new_pubs/jp1_02.pdf; Internet; accessed 17 December 06.

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[13]Joint Chiefs of Staff, Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 287.

[14]Ibid., 26.

CHAPTER 2

BACKGROUND

Joint Publication 3-30, *Command and Control for Joint Air Operations*, states the joint force commander will appoint a joint forces air component commander. The joint forces air component commander is not necessarily an Airman and could be from any service, but generally comes from the service that provides the preponderance of air assets and the ability to provide command and control of those assets. Joint doctrine and individual service doctrine all address the role of the joint forces air component commander, the establishment of the airspace control authority and the role of airspace control in combat operations. Both joint and service air control doctrine briefly touch upon airspace control during stability operations. The same doctrine used for major combat operations is also used for stability operations with caveats. Is the same doctrine used for major combat operations and stability operations effective in both situations or does each operation require different doctrine? If this is the case, current doctrine does not adequately address the current operating environment. This chapter contains a review of joint and service doctrine regarding airspace control, followed with a review of issues related to airspace control during stability operations. In addition, service specific airspace control equipment and training is briefly discussed. This overview of doctrine, equipment and training will set the stage to examine airspace control experienced during the Vietnam War (chapter 3) and in Operation Iraqi Freedom (chapter 4) and to determine if the current doctrine is effective in a stability operations environment (chapter 5).

Joint Air Operations Doctrine

JP 3-30 establishes some key points. The first is, "joint air operations are normally conducted using centralized control." Centralized control ensures a single commander for the "planning, directing, and coordinating a military operation or group/category of operations." Centralized control provides coherence, guidance, and organization to the air effort coupled with the ability to focus the impact of air capabilities and forces wherever needed across the theater of operations. Most importantly it ensures the effective and efficient use of air capabilities/forces in achieving the joint force commander's objectives. Decentralized execution allows the joint forces air component commander to achieve effective span of control and foster initiative, responsiveness and flexibility by delegating execution to subordinate commanders in order to generate the tempo of operations required and to cope with the uncertainty, disorder, and fluidity of combat.[1]

JP 3-52, *Joint Doctrine for Airspace Control in the Combat Zone*, "prescribes doctrine for joint airspace control in the combat zone."[2] The intent of joint airspace control is to provide safe, efficient and flexible use of airspace to maximize operational flexibility. The joint force commander normally designates the joint forces air component commander and depending on the situation, the force commander can also make the joint force air component commander the airspace control authority.[3] This has normally been the case. Historically (Desert Storm, Allied Force, Enduring Freedom, and Iraqi Freedom) the joint forces air component commander has always been the airspace control authority and the Area Air Defense Commander (AADC). The joint forces air component commander has several tools available to assist with the centralized control and

decentralized execution of joint airpower. The most important aspect regarding the joint forces air component commander's role as the airspace control authority is the creation of the Airspace Control Plan (ACP). "The ACP establishes procedures for the ACS in the operational area."[4] ACS, Airspace Control System, is the joint term for the integration of each services airspace control system. JP 3-52 does not dictate the type of equipment the services must have in order to create an airspace control system, but it directs that the system have "a reliable, jam-resistant, and secure communications network."[5] The system should be flexible enough to rely on more than voice communications[6], so there is a need for data links and the ability to provide positive and procedural control. Subordinate units must also be able to clearly understand the joint air forces component commander's intent and the details of the airspace control plan and airspace control order in order to be able to execute operations in case of communications difficulties with the air operations center (AOC). Finally, the airspace control system must be responsive to the enemy and unfolding operations.[7] This requires equipment to be mobile (ground or airborne) and personnel trained in various control procedures and scenarios.

The airspace control plan details what airspace coordination measures are in force and how they are implemented. The Airspace Control Order (ACO) derives from the airspace control plan, implementing the specific control procedures for particular time periods. [8] The airspace control order provides centralized direction to deconflict, coordinate, and integrate the use of airspace within the operational area,[9]" therefore "all missions are subject to the airspace control order."[10] Although this "does not imply any level of command authority over any air assets,"[11] "component air operations must adhere to the guidance provided by the airspace control plan (ACP), the airspace control

order (ACO), the area air defense plan (AADP), and the special instructions (SPINS) located in the air tasking order (ATO) to assure deconfliction, minimize the risk of fratricide, and optimize the joint force capabilities in support of the joint force commander's objectives."[12] This is important because the issue of command authority over air assets and the concept of a "single air manager" have historically been an area of doctrinal contention between all the services. Chapter 3 discusses some of the issues that arose during the Vietnam War. The airspace control plan also dictates the type of control (positive or procedural) that is most appropriate for the task and situation. Understanding positive and procedural control is extremely important and will be discussed in greater detail since it is often the most significant difference in the manner the Air Force, Navy, Marine Corps and Army control their air assets. Finally, the airspace control plan specifies the airspace control measures to be used and defines the service-specific terms and graphics.[13] Services ought to agree on common terms, graphics and definitions in order to simplify the execution of joint airspace control under a joint airspace control system.

When components provide inputs into the fire support coordination measures and airspace control order that are deemed necessary for operations, close coordination to deconflict airspace is accomplished. These inputs are used to coordinate airspace use and joint fires employment.[14] A robust and interoperable airspace control system is required in order to make changes to the airspace control order as the situation dictates. The need to account for unmanned aerial vehicles while using the same "principles of airspace management used in manned flight operations" is briefly discussed. A caveat states that these principles will "normally apply to UAV operations."[15] Providing operators of

unmanned aerial vehicles specific airspace for use is essentially no different than establishing other airspace coordination measures to separate manned aircraft working areas, such as kill boxes. Although kill boxes are used for interdiction operations, the term is sometimes used to define any container to deconflict aircraft air the common grid reference system. This usage is doctrinally incorrect. A different joint doctrinal term should be created to avoid confusion. It is necessary to apply the same procedures of manned flight to unmanned flight in discussing coordination because the numbers of unmanned aerial vehicles in the battlespace is increasing and even used at the small unit level. By not using the same standards and methods as manned aircraft, unmanned aerial vehicles could potentially pose a danger to manned aircraft. JP 3-52 may need to address under what conditions unmanned aerial vehicles will operate under the same principles of manned flight operations.

Finally, one of the most important elements to highlight regarding the joint forces air component commander's role as airspace control authority is he "does not have the authority to approve, disapprove, or deny combat operations."[16] Regardless of how problematic airspace issues become during operations, the airspace control authority cannot stop operations on his own authority; he must refer matters forward to the joint forces commander for resolution if unable to at the component commander's level. The growing numbers of unmanned aerial vehicles will contribute to disagreements between commander's regarding the appropriate airspace structure.

JP 3-52 addressed airspace control during military operations other than war or stability operations. Those issues are discussed later in this chapter under the heading *Particular issues the JFACC may encounter in Stability Operations.*

Types of Control Procedures

According to JP 3-30, airspace control procedure objectives include; "to prevent mutual interference, facilitate air defense identification, safely accommodate and expedite the flow of all air traffic in the area of responsibility/joint operations area, enhance effectiveness in accomplishing the joint force commander's objectives, and prevent fratricide."[17] This can be accomplished by one of three methods; positive, procedural control, or a combination of the two.

> **Positive control** relies on radars, other sensors, identification, friend or foe/selective identification feature, digital data links, and other elements of the air defense system to positively identify, track, and direct air assets. **Procedural control** relies on airspace coordinating measures such as comprehensive air defense identification procedures and ROE, low level transit routes, minimum-risk routes, aircraft identification maneuvers, fire support coordinating measures, coordinating altitudes, restricted operations zones/restrictive fire areas, standard use Army aircraft flight route, and high-density airspace control zones.[18]

Joint Air Control Capability

Joint air control capability consists of the elements each individual service provides. When a theaterwide airspace control system is established it is called the Theater Air-Ground System (TAGS). The TAGS "provides the framework that allows each service to exist in a joint and coalition force environment and support the Joint Forces Commander."[19] (Figure 3) There is no standard equipment or training that joint forces employ. Each service decides how best to control its aviation assets and fields the systems and trains the personnel deemed necessary to provide airspace control in accordance with joint and service doctrine.

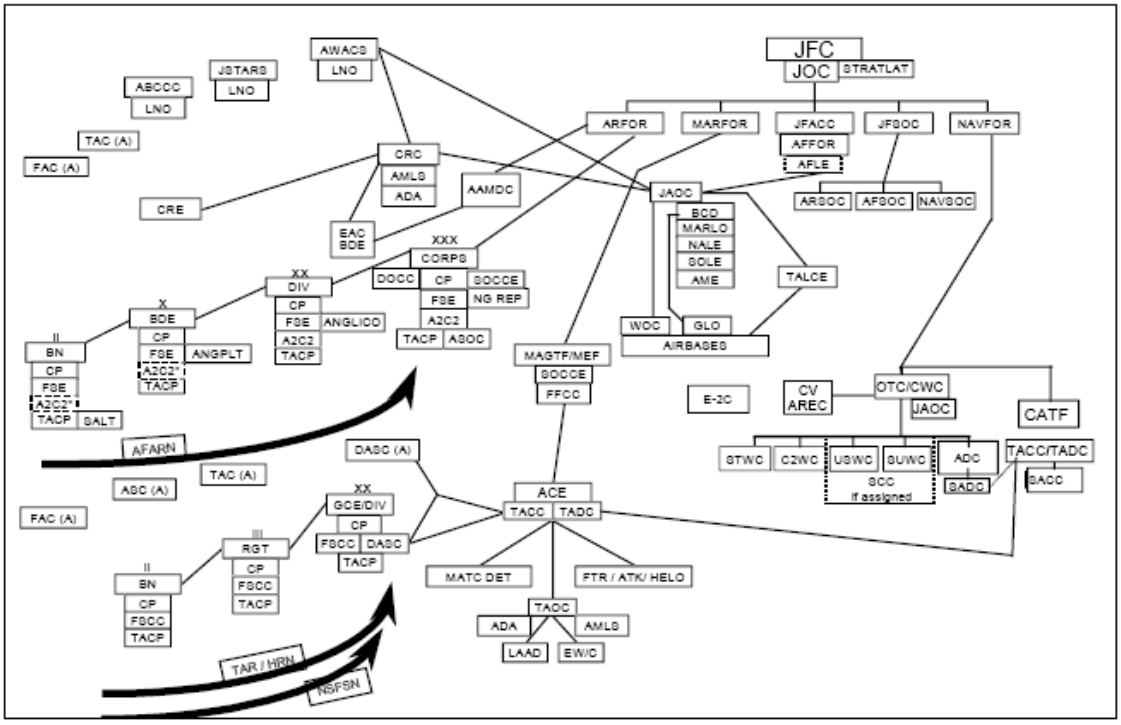

Figure 3. Notional Theater Air-Ground System
Source: Headquarters, Department of the Army, FM 3-52, *Army Airspace Command and Control in a Combat Zone* (Washington, DC: August 2002), 1-8.

AFDD 2-1.7, *Airspace Control in the Combat Zone*

Air Force doctrine on airspace control is set out in AFDD 2-1.7, *Airspace Control in the Combat Zone*. "Airspace control is provided in order to prevent fratricide, enhance air defense operations, and permit greater flexibility and safety of operations."[20] Airspace control fundamentals are unity of effort, common procedures and simplicity.

Like JP 3-52, AFDD2-1.7 states an airspace control authority is needed to achieve "unity of effort through centralized planning and control"[21] and highlights the need for reliable and interoperable command and control systems that are survivable and redundant.[22]

Training is another important prerequisite required for effective airspace control. Training is the responsibility of the individual service components, as AFDD 2-1.7 notes, but all the services should conduct training together in joint exercises to enhance operating procedures, develop new techniques, and ensure the operability of equipment.[23] Regardless of the ability to provide positive or procedural control, or both, these methods need to be practiced individually and together as a joint force. Exercises should create an environment in which the services must pass aircraft to different control sectors and ensure the proper hand off of aircraft to another agency, manage the opening and closing of air routes, airspace areas, and lost communication procedures.

As in JP 3-52, AFDD 2-1.7 highlights the important role of the airspace control plan and airspace control order in establishing procedures for establishing airspace control measures.[24] Although not explicitly stated that control should be delegated to the lowest echelon possible, it hints at such when the doctrine states that "each component commander within a joint force:

> Provides airspace control in areas designated by the ACA in accordance with directives and/or procedures in the ACP, and is prepared to provide airspace control in other areas designated by the ACA when combat or other factors degrade the airspace control system.[25]

This statement explains the Air Force principle of decentralized execution. In addition to pushing control down to the component commanders to handle as necessary, Air Force doctrine calls for the "necessary equipment and personnel for airspace control functions" and the need to identify them to be included in the airspace control plan.[26]

AFDD 2-1.7, as in JP 3-52, states the need for the airspace control plan to take into account host nation requirements and the need to integrate into civil air traffic procedures.[27] It also briefly discusses the need to transition from wartime to peacetime

conditions and the need to redeploy the TACS and hand over airspace control to civil authorities.[28] Almost the exact wording is used for its discussion of stability operations.[29] Again, as in JP 3-52, this discussion glosses over the need for the TACS during stability operations, when major combat operations are over and military control is still needed because of civil disorder and violence.

Unmanned Aerial Vehicles (UAVs) are briefly touched upon in doctrine. The subject document argues for employing the same principles for airspace control for manned flight operations as for unmanned aerial vehicles.[30] Unmanned aerial vehicles are available in sizes ranging from model aircraft size to the size of manned aircraft. The proliferation of small unmanned aerial vehicles at the lowest echelons of ground forces will increase the number of unmanned aerial vehicles operating in a particular airspace and contributes to a dense airspace environment. Many of the smaller unmanned aerial vehicles are almost impossible to be tracked by radar and are too small to carry standard electronic identification systems. This makes it harder to track for deconfliction purposes and makes it harder to distinguish friendly unmanned aerial vehicles from enemy unmanned aerial vehicles. The ability of conventional forces to employ unmanned aerial vehicles is well known. It is only a matter of time before insurgents and terrorist organizations acquire unmanned aerial vehicles, even primitive ones, to penetrate air defenses and cause severe damage at a relatively low cost if they were to carry biological or chemical agents.

Elements of the Air Force TACS

"The TACS is a hierarchy of organizations and C2 systems to plan, direct, and control theater air operations and coordinate air operations with other Services and allied forces. The TACS airspace control role is to be the executor of the ACP and ACO."[31] It is comprised of several components, divided into ground and airborne elements. The ground elements include the Air Operations Center, Control and Reporting Center, Air Support Operations Center, and Tactical Air Control Parties. The airborne elements include the Airborne Warning and Control System, Joint Surveillance Targeting and Attack Radar System, Forward Air Controllers (Airborne) and Strike Coordination and Reconnaissance Operations (Figure 4).

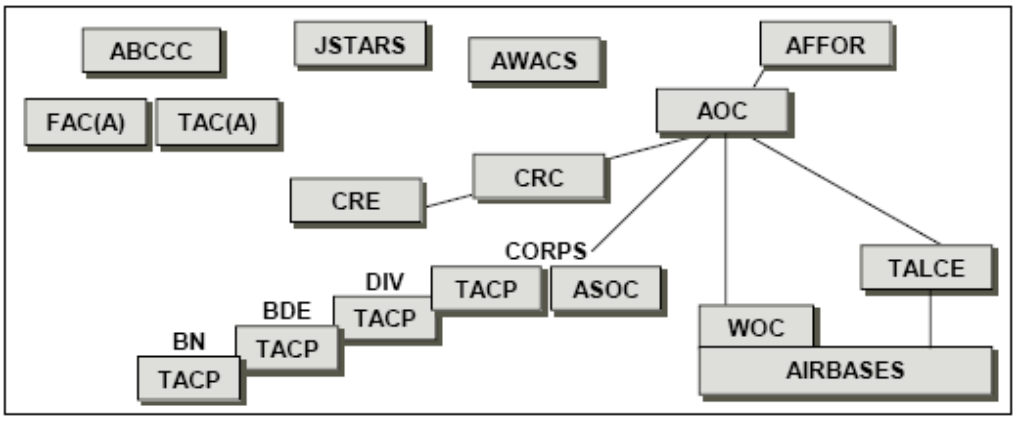

Figure 4. Notional Tactical Air Control System
Source: Headquarters, Department of the Army, FM 3-52, *Army Airspace Command and Control in a Combat Zone* (Washington, DC: August 2002), 1-9.

The senior element of the TACS is the Air Operations Center. It is the central focal point for planning and executing air and space operations providing the JFACC the ability to plan and execute intensive air operations. It is manned to meet the needs of the

JFACC, but can be tailored to meet the changing operating environment. The Air Force considers the air operations center to be a weapon system. As a result, it is managed and funded as such. The air operations center is not only comprised of Air Force personnel, but also has service or functional component commander liaisons to coordinate, deconflict and integrate air operations from the services or functional components.[32]

"The CRC is a deployable battlespace management platform employed at the tactical level to support air operations planning and execution across the entire spectrum of operations, from stability operations to a major combat operation."[33] It is subordinate to the air operations center and can operate alone or in conjunction with other elements of the TACS such as the AWACS and JSTARS. It has the ability to manage and provide airspace control within a delegated airspace sector in support of theater air operations.[34] It uses mobile radar equipment to provide airspace control in its sector or area of responsibility.

An Air Support Operations Center is directly subordinate to the air operations center but is located at the senior Army tactical level of command. It coordinates in order to integrate air operations into the corps area of responsibility. Thus, Army requests for air support are handled by the ASOC. The ASOC has the ability to provide procedural airspace control through the implementation and management of airspace coordination measures in order to deconflict airspace usage between a myriad of users.[35]

Tactical Air Control Parties are the primary liaisons between the Air Force and Army maneuver units from the battalion to corps level. They provide guidance and advice to Army commanders and provide the terminal attack control of Close Air Support assets to the ground forces.[36]

The Airborne Warning and Control System (AWACS) is an airborne radar platform and has the ability to provide procedural and positive control, detect long range and low level targets, provide early warning and combat identification, and transmit the tactical air picture through data links to other TACS elements. It is directly subordinate to the air operations center.[37]

The Joint Surveillance Targeting Attack Radar System (JSTARS) is another airborne command and control platform that is designed to find, track, and identify moving ground targets providing ground forces commanders with the enemy ground picture. Like AWACS, its picture can be data linked to other elements of the TACS.[38]

Forward Air Controllers (Airborne) are "an airborne extension of the TACP and has the authority to direct aircraft delivering ordnance to a specific target cleared by the ground commander."[39] They can provide a different and sometimes advantageous vantage point over ground controllers to direct aircraft delivering ordinance to a target. They provide airspace control through procedural means.

Strike Coordination and Reconnaissance Operations are similar to FAC (A) but are not trained or cleared to direct the release of ordinance for CAS operations. They are used to coordinate killer scout operations into and out of working areas through procedural control.[40]

FM 3-52, *Army Airspace Command and Control in a Combat Zone*

FM 3-52, *Army Airspace Command and Control (A2C2) in a Combat Zone*, is the Army's doctrinal manual for airspace control. A2C2 uses the joint definition for airspace control stated in JP 3-52 while emphasizing that "airspace control does not infringe on the authority vested in commanders to approve, disapprove or deny combat operations."[41]

This statement parallels the one made in AFDD 2-1.7. The same principles discussed in JP 3-52 and AFDD 2-1.7, regarding the considerations and planning for airspace control, airspace control methods (positive and procedural), the theater air-ground system (including each of the service systems)[42] are also discussed in detail.

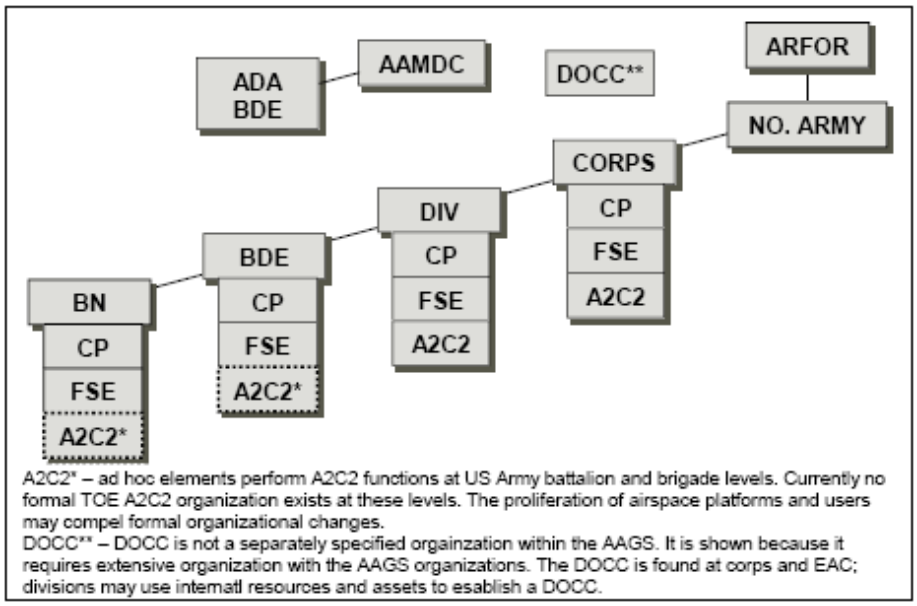

Figure 5. Notional Army Air-Ground System
Source: Headquarters, Department of the Army, FM 3-52, *Army Airspace Command and Control in a Combat Zone* (Washington, DC: August 2002), 1-15.

The Army's Air-Ground System (AAGS) is used to plan and execute requests for air support to integrate into the ground scheme of maneuver. The AAGS consists of several elements to include command posts, fire support elements, air defense elements, A2C2 elements and liaisons (Figure 5).[43]

Command posts are located at every level of command and are used by the commander's staff to synchronize A2C2 with the ground scheme of maneuver. Fire

support elements, located in the command post, coordinate and integrate fires without hindering simultaneous air operations. Air defense elements "plan, coordinate, and integrate air and missile defense." A2C2 elements are "the Army's principle organization for airspace control" and located inside the command post.[44] Liaisons from various services and functional components are also included in the system to integrate joint and component forces.[45] The most important element related to airspace control and the integration of joint fires is the Battlefield Coordination Detachment (BCD). The BCD is the Army commander's liaison at the Air Operations Center and serves as the critical link between the air operations center and Army commanders for air support requests to include close air support and air interdiction. They coordinate the placement of fire support coordination measures (these can be found in detail in FM 3-52) as the battlespace changes and inform the air operations center of the location of special operations forces. They also perform a myriad of other functions found in FM 3-52.[46]

Most importantly,

> The Army relies on procedural controls to synchronize airspace users. The Army's methodology for airspace control in this area is based on using standing operating procedures, graphics, coordinating altitude, fire support coordinating measures, air defense rules of engagement, and airspace control measures.
>
> Standing operating procedures and operational graphics fix responsibility to the unit commanders responsible for controlling maneuver in the area of operations. For the vertical dimension of the area of operations, Army aircraft—except for special electronic mission aircraft (SEMA) and UAV—operate largely in the terrain flight environment below the coordinating altitude. Accordingly, as with other maneuver elements, SOPs provide the most effective control techniques for this environment. Fire support coordinating measures help the fire support coordinators ensure that fire support systems interface and that fires do not jeopardize troop safety or disrupt adjacent unit operations. Air defense rules of engagement—chiefly hostile criteria, weapons control status, and weapon engagement zones—ensure identification and control of airspace users. Airspace users follow joint airspace procedural control measures only as required to supplement Army control measures and facilitate employing joint forces.

> Commanders use such measures on a case-by-case evaluation; use the factors of METT-TC; and consider the requirements of other service components.[47]

These two paragraphs are important to highlight and should be read in full context because of its implications to the JFACC during stability operations. The importance and implications on why this is important are discussed in Chapters 4 and 5. Finally, the Army Air-Ground System integrates with the Air Force Tactical Air Control System in order to provide positive control of close air support missions.[48]

MCWP 3-52, *Control of Aircraft and Missiles* (Marine Corps Airspace Control)

Marine air command and control systems provide the aviation combat element commander with several key elements. The first unity of effort is like that discussed in JP 3-52, AFDD 2-1.7 and FM 3-52. The second, is it "integrates the elements of the command and control system," which are the people, information, and the command and control support structure. This gives the aviation combat element commander the tools to manage the battle. The third element is to "disseminate common situation awareness."[49]

The Marines operate under the principle of centralized command and decentralized execution. This is defined as planning, directing, and coordinating all aspects of aviation employment. Decentralized execution is optimizing "the flexibility, versatility, and responsiveness of aviation by allowing control of his [aviation combat element commander] assets to be conducted by agencies both responsive to himself and in touch with the dynamic changes to the battle."[50]

MCWP 3-25 highlights the differences in this philosophy with that of the Air Force and the Army. It views the Air Force concept of centralized control and decentralized execution as fundamentally different based on the preponderant use of

positive versus procedural control. The Army has no concept similar to the Marine Corps or the Air Force so it uses procedural control. The Marine Corps uses a blend of positive and procedural control, thus making their philosophy different.[51] This is a simplistic explanation of why the differences in control philosophy. Although the Air Force does rely mainly on positive control, procedural control is a method used because it is impossible to provide positive control to all aviation assets at all times.

The Marine Corps also describes two types of control: air direction and air control. “Air direction is the authority to regulate the employment of air resources including both aircraft and surface-to-air weapons to maintain a balance between their availability and the priorities assigned for their use.” Some of the tasks involved in air direction include changing scheduled missions, creating the air tasking order and collecting information on mission status. “Air control is the authority to direct the physical maneuver of aircraft in flight or to direct an aircraft or surface-to-air weapon unit to engage a specific target.” Tasks include airspace management and airspace control.[52]

Positive and procedural control are defined as in JP3-52, but MCWP 3-25 does highlight that positive control is conducted by exception. Thus, positive control is provided only if better, more, or more current information is available.[53]

The Marine air command and control system can be tailored to the needs of the Marine Air Ground Task Force (MAGTF) (Figure 6). If a Marine Expeditionary Force is deployed then it will receive the full compliment of aviation control capabilities. If a smaller mission dictates the deployment of a Marine Expeditionary Unit, then the air

control staff will consolidate with the amphibious squadron commander's staff and rely on elements of the Navy air control system. [54]

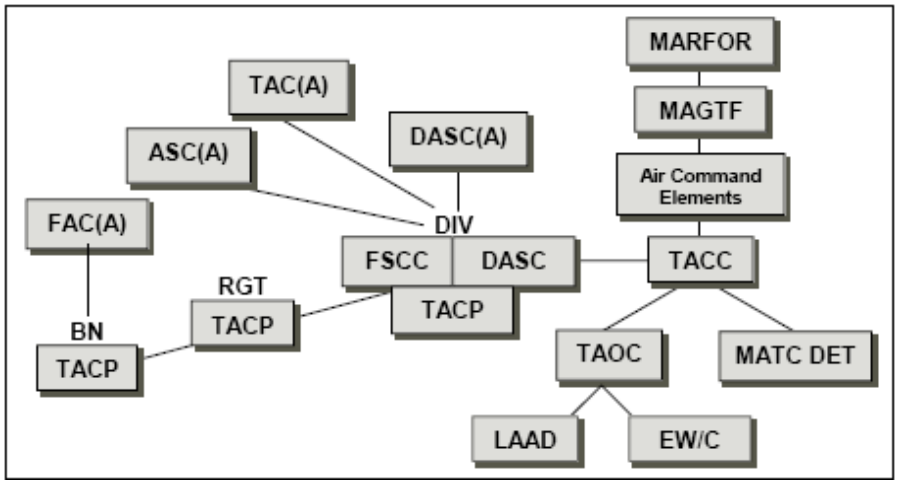

Figure 6. Notional Marine Corps Airspace Control System
Source: Headquarters, Department of the Army, FM 3-52, *Army Airspace Command and Control in a Combat Zone* (Washington, DC: August 2002), 1-13.

As in all previously reviewed doctrinal publications, MCWP 3-52 discusses joint air control, the airspace control authority and various airspace control measures.[55] MCWP 3-52 also discusses air control in MOOTW or stability operations. The discussion is the same as in JP 3-52, although MCWP 3-52 highlights that "the most restrictive airspace control procedures are normally employed in peace operations, as well as a high degree of positive air control."[56] This is further discussed in chapter 5.

Finally, historically there has been tension between the services regarding the "single air manager" concept and control of aviation assets. This issue is discussed in some detail in chapter 3. Today, "the guidelines for the relationship between the Marine air-ground task force commander and the joint force commander regarding aviation

assets are contained in the Policy for Command and Control of USMC TACAIR in Sustained Operations Ashore (Joint Pub 0-2), that was previously known as the Omnibus Agreement."[57] This agreement is discussed in chapter 4.

Particular Issues the JFACC May Encounter in Stability Operations

The operating environment during stability operations provides some unique challenges to the JFACC. Some of these unique challenges include the "possible use of airspace by civilian airlines, national and international agencies, governmental and nongovernmental organizations (NGOs), allied and coalition forces, and other participating entities."[58] As a result of greater interaction with civilian agencies and military forces in stability operations, airspace planning can become very intense and require even more detailed airspace control procedures than during major combat operations, especially in a fluid environment such as during counterinsurgency operations.[59] For example, during major combat operations the JFACC simply shuts down the airspace in a particular area through Notices to Airmen (NOTAMS) via the International Civil Aviation Organization (ICAO) system. This results in the virtual elimination of civilian air traffic through the combat zone. During stability operations, civilian aircraft will most likely be operating within the same airspace as military aircraft conducting military operations requiring a greater need of airspace control to ensure civilian aircraft do not enter restricted airspace or are accidentally shot. Methods to accomplish deconfliction, coordination, and integration range from positive control of all air assets in an airspace control area to procedural control of all such assets, with any effective combination of positive and procedural control between the two extremes.[60] The complexities of a stability operation environment often require more intense

planning and integration and more restrictive rules of engagement. These more restrictive rules of engagement could require more rigorous control of aircraft by using positive control to get aircraft through high density civil traffic areas to procedural control from a forward air controller that must have "eyes on" the target prior to weapons release.

Interestingly, JP 3-52 states that due to the possibility of quick transitions between combat to non-combat and back again, "*all air missions,* including both fixed- and rotary-wing of all components, *should appear on the appropriate ATO or flight plan, if an ATO is not produced*. In addition, *all aircraft must maintain contact with airspace control agencies and operate on designated IFF modes and codes*, which must be appropriately checked prior to mission start. *This type of rigorous control is necessary* because the mix of friendly, enemy, and neutral aircraft and mission constraints require the JFC to strictly control flights in the operational area. No matter what methods the JFC chooses, they need to be continually evaluated for effectiveness and efficiency as the environment and mission change"[61] The importance of this statement will be discussed in chapter 4 and chapter 5.

Stability operations can see missions ranging from supporting daily patrols and small raids to large scale raids and operations such as the attack on Fallujah, Iraq in 2004. Unlike major combat operations, where civilian air traffic can be shut out of the combat zone, civilian air traffic will continue during stability operations. Therefore, airspace control procedures must be in place to minimize interference with civilian air traffic, but maximize joint fires if required. In a high-density airspace environment this will usually require a combination of positive and procedural control. When procedural control is used, all aviation users must be clearly aware of where civilian traffic operates. Positive

control is highly effective for managing aircraft into a high density airspace environment to ease the terminal attack controller's workload using procedural control in the zone. This environment also highlights the need for all fixed and rotary wing assets to be on the air tasking order. Unmanned aerial vehicles employed at the company level, containing no Identification, Friend or Foe/Selective Identification Feature (IFF/SIF) equipment, would not need to be listed but would have to operate in accordance with the airspace control order to prevent collision with other aircraft. The requirement to fly above the coordinating altitude would require inclusion into the air tasking order.

During stability operations the JFACC is also concerned with establishing procedures that must integrate with the host nation's civil air traffic control, if one exists, and comply with International Civil Aviation Organization procedures. Foreign Internal Defense (FID) will probably be occurring to protect the host nation "from subversion, lawlessness, and insurgency." JP 3-52 addresses airspace control during FID, stating "airspace control in FID is based on air traffic regulations and control of civil and military airspace users. In FID, the ATC system of the HN frequently provides the framework upon which most of the combat zone airspace control function takes place."[62] Whether or not this structure already exists, or must be established from scratch, the JFACC as airspace control authority must integrate the airspace control system into the existing structure and coordinate with civil traffic or establish procedures from scratch and then begin the gradual process of transferring responsibility for control to civilian authorities. An airspace control system though is still required to optimally support troops engaged in stability operations. The need to coordinate with host nation civil authorities is always present during stability operations. This is necessary for coordinating military

airspace requirements, "and integrating and coordinating air operations with ground activities. Air traffic services may be expanded to provide greater positive control of airspace users."[63] During other activities such as "intelligence missions, raids, rescue missions, or other limited uses of military forces,"[64] implementation of airspace control procedures may be required. JP 3-52 urges some planning for these type of operations, even if brief and informal to provide deconfliction between military and civil traffic and to ensure the timely and effective implementation of appropriate airspace control procedures if hostilities ensue.[65]

Stability operations will usually take place in an urban environment so there will be an emphasis on minimizing collateral damage. Tighter rules of engagement may require positive airspace control procedures.[66]

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[1]Joint Chiefs of Staff, Joint Publication 3-52, *Joint Doctrine for Airspace Control in the Combat Zone* (Washington DC., 30 Aug 2004), vii-viii [document on-line]; available from http://www.dtic.mil/doctrine/jel/new_pubs/jp3_52print.pdf; Internet; accessed 2 October 2006.

[2]Ibid., I-1.

[3]Ibid., II-1.

[4]Ibid., II-4.

[5]Ibid., I-4.

[6]Ibid., I-4.

[7]Ibid., I-4.

[8]Ibid., II-6.

[9]Joint Chiefs of Staff, Joint Publication 3-30, *Command and Control for Joint Air Operations* (Washington DC., 5 Jun 2003), ix [document on-line]; available from http://www.dtic.mil/doctrine/jel/new_pubs/jp3_30print.pdf; Internet; accessed 2 October 2006.

[10]Ibid., I-3.

[11]Ibid., ix.

[12]Ibid., I-3.

[13]Joint Chiefs of Staff, Joint Publication 3-52, *Joint Doctrine for Airspace Control in the Combat Zone*, II-4.

[14]Ibid., III-3.

[15]Ibid., III-6.

[16]Ibid., vii.

[17]Joint Chiefs of Staff, Joint Publication 3-30, *Command and Control for Joint Air Operations*,II-4.

[18]Joint Chiefs of Staff, Joint Publication 3-52, *Joint Doctrine for Airspace Control in the Combat Zone*, x.

[19]Headquarters, Department of the Air Force, Air Force Doctrine Document (AFDD) 2-1.7, *Airspace Control in the Combat Zone* (Maxwell AFB, Alabama: Air Force Doctrine Center, 13 Ju1y 2005), 32 [document on-line]; available from http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_1_7.pdf; Internet; accessed 2 October 2006.

[20]Ibid., 1.

[21]Ibid., 2.

[22]Ibid., 3-4..

[23]Ibid., 5.

[24]Ibid., 9.

[25]Ibid., 11.

[26]Ibid., 11.

[27]Ibid., 14.

[28]Ibid., 22.

[29]Ibid., 24-25.

[30]Ibid., 26.

[31]Ibid., 29-30.

[32]Ibid., 33-31.

[33]Ibid., 35.

[34]Ibid., 35.

[35]Ibid., 36.

[36]Ibid., 36.

[37]Ibid., 36.

[38]Ibid., 36-37.

[39]Ibid., 37.

[40]Ibid., 37.

[41]Headquarters, Department of the Army, FM 3-52, *Army Airspace Command and Control in a Combat Zone* (Washington, DC., August 2002), 1-1 [document on-line]; available from https://akocomm.us.army.mil/usapa/doctrine/DR_pubs/dr_aa/pdf/fm3_52.pdf; Internet; accessed 1 December 2006.

[42]Ibid., 1-2 thru 1-17.

[43]Ibid., 1-14.

[44]Ibid., 2-8 thru 2-10.

[45]Ibid., 3-7 thru 3-10.

[46]Ibid., 3-2 thru 3-3.

[47]Ibid., 3-15 thru 3-16.

[48]Ibid., 3-18.

[49]Headquarters, United States Marine Corps, *Marine Air Command and Control System Handbook*, MCWP 3-25.3 (Washington, DC., 2 Dec 97), Chapter 1, 3-5 [document on-line]; available from http://ismo-www1.quantico.usmc.mil/docdiv; Internet; accessed 3 January 2007.

[50]Ibid., Chapter 2,1.

[51]Ibid., Chapter 2, 4-5.

[52]Ibid., Chapter 3, 1-3.

[53]Headquarters United States Marine Corps, *Control of Aircraft and Missiles,* MCWP 3-2. (Washington, DC., 26 Feb 98), Chapter 3, 6-7 [document on-line]; available from http://ismo-www1.quantico.usmc.mil/docdiv; Internet; accessed 18 January 2007.

[54]Ibid., Chapter 4, 4-5.

[55]Ibid., Chapter 5, and Appendix A.

[56]Ibid., Chapter 4, 15.

[57]Ibid., Chapter 4, 11.

[58]Joint Chiefs of Staff, Joint Publication 3-30*, Command and Control for Joint Air Operations,* I-4.

[59]Joint Chiefs of Staff, Joint Publication 3-52, *Joint Doctrine for Airspace Control in the Combat Zone*, xi.

[60]Joint Chiefs of Staff, Joint Publication 3-30*, Command and Control for Joint Air Operations* ,ix.

[61]Joint Chiefs of Staff, Joint Publication 3-52, *Joint Doctrine for Airspace Control in the Combat Zone* ,IV-3.

[62]Ibid., IV-3.

[63]Ibid., IV-4.

[64]Ibid., IV-4.

[65]Ibid., IV-4.

[66]Ibid., IV-5.

CHAPTER 3

THE VIETNAM WAR

The focus of this case study is the use of airpower in South Vietnam, where airpower was used in support of ground forces during both conventional operations and unconventional operations. Interservice differences and cooperation provide the backdrop for issues that would arise during the Vietnam War. The theater and tactical command and control arrangements are discussed in order to understand the environment under which airspace control operated. A brief discussion of the "single air manager" concept is discussed to provide the background to an issue that came to peak during Operation Niagara at Khe Sanh. Khe Sanh is used to illustrate the issues General Westmoreland encountered when trying to conduct operations, both stability and major combat, across a large area with more than one ground force commander and enemy activity in both a linear and non-linear environment. The chapter is concluded with a discussion of the elements of the air control system used during the Vietnam War.

Interservice Differences and Cooperation

During the Vietnam War the idea of having a joint system to manage all fixed-wing tactical aircraft was not accepted by all the services.[1] Each of the services had its own issues with having a single air component commander. The Army was concerned that the Air Force was pushing the concept of a single commander for air operations in order to control Army aviation assets such as the helicopter. Helicopters were becoming central to the Army's concept of air mobility. Rotary wing aircraft were also beginning to play a large part in the Army's ability to rapidly move around the battlefield both to

engage the enemy and to resupply forces across the theater. This fear was born out when a directive on 18 August 1962 from General Harkins, the commander of US Military Assistance Command Vietnam (MACV) "stated the air operations center, with the Air Force component commander as co-ordinator, was to advise on command decisions and pass them to all forces concerned." This directive stemmed from disagreements between the Air Force and Army over the term air. The Air Force thought it meant all aircraft, to include Army aircraft. The Air Force expected these aircraft to report to Air Force control facilities. The directive resulted in the Army losing "direct control of its aviation units."[2] This issue certainly contributed to continued interservice rivalry between the two services. The Marine Corp added its voice to the chorus and also stood against this despite the lessons learned from the Korean War and the close cooperation that it shared with the Air Force in that conflict. During the Korean War, air control was centralized but the Marine Corps did not like fact that their air was put under "Air Force" control; they felt took away from their combined arms team thereby reducing their ability to support the Marine on the ground. The Air Force was seen be all the other services as having a parochial interest in controlling all air. It is now fairly established among various scholars that the Air Force was in fact closely following its doctrine of centralized control of airpower, although the methods of achieving them seemed parochial to the other services.

Doctrinal differences between the Air Force and the Army and Marine Corps stemmed from differing concepts of unity of command. The Army saw airpower as most responsive to ground needs if controlled at the operational or corps level, while the Air Force viewed air power to be more efficient when centrally controlled and then

concentrated where needed to support ground operations. To do this, the air commander needed the flexibility to call on any airpower available. From these two views of unity of command grew two separate control systems; the Air Force's tactical air control system and the Army-Marine Corps air-ground system.[3]

Incorporating the lessons of World War II, the origins of today's air control system are found in FM 31-35, Air Ground Operations, published in August 1946, prior to an independent Air Force. FM 31-35 set up procedures for close air support, creating the two parallel systems. They were the Air Ground Operations System and the Tactical Air Control System. This parallel structure was joined at the top with the "Joint Operations Center where both air and ground intelligence officers worked together to coordinate air support to ground units."[4]

The shortcomings of such a system were eventually recognized and the services, especially the Army and the Air Force worked to solve them. By the beginning of 1965, a unified tactical control system did not yet exist,[5] although steps were taken to improve the situation. In June 1962 the United States Strike Command began tests to devise means to facilitate air support. After four USSTRICOM joint exercises (Three Pairs, Coulee Crest, Swift Strike III, and Desert Strike), the "Concept for Improved Joint Air-Ground Coordination" was signed by the Air Force Chief of Staff Gen John P. McConnell on 19 March and Army Chief of Staff Gen Harold K. Johnson on 28 April 1965.[6] Between August 24 and September 22, 1964, the Army and Air Force conducted an exercise called Indian Summer III. In this exercise the Air Force experimented with various methods to solve the "Army's perennial complaint that the Tactical Air Control System was not mobile enough to keep up with a rapidly advancing ground force." The

Air Force created a Direct Air Support Team for the division level. When the division command post moved, the direct air support team simply moved with the division, never "breaking contact with its subordinate tactical air control parties or its parental TACC." The TACC was the Tactical Air Control Center. The direct air support team equipment was located in a van to make it mobile.[7] The Air Force also used an airborne direct air support team working in conjunction with forward air controllers and a control and reporting center that "provided radar surveillance and control of the airspace over the area of operations. This radar was complemented by a light-weight, portable radar (UPS-1) to cover lower altitudes that the CRC could not reach. All of these familiar elements of the system were vehicles for implementing the Air Force doctrine that the air commander must maintain centralized control of his air assets, although their control was decentralized for operations."[8]

The development of the Tactical Air Control Center to plan and coordinate the employment of the total tactical air effort was the direct result of the "Concept for Improved Joint Air-Ground Coordination." As a result, the previously established Vietnamese Air Force/2d Air Division Air Operations Center (VNAF/2d AD AOC) became the 2d AD Combat Operations TACC. At the Army Corps level, ASOCS, now designated direct air support centers (DASCs) became subordinate to the TACC.[9] "Air Force tactical air control parties (TACPs) forwarded requests for immediate air support to DASC over an Air Force request net, with tactical air control parties at progressively higher levels monitoring the requests and having authority to disapprove if the Army fire support coordination center or tactical operations center considered the request

inappropriate. Preplanned requests for air support continued to be forwarded over Army communications systems."[10]

This new US Army and US Air Force concept for joint air-ground coordination, established in 1965, is the forefather to the concept of the unified/joint commander who decides on a day-to-day basis the proportion of the air effort to various functions such as counterair, interdiction, and close-air-support tasks.[11]

Theater Command and Control

Interservice rivalries, doctrinal differences and political constraints also led to multiple chains of command at the theater level. The command and control system not only divided and fragmented aircraft control; it even caused 7th AF to report to two bosses. Admiral Sharp, CINCPAC from 30 June 1964 to 31 July 1968[12] best describes the command structure he fully supported:

> Air operations against North Vietnam were controlled by CINCPAC through his subordinates, the Commander in Chief Pacific Fleet (CINCPACFLT) and the Commander in Chief Pacific Air Force (CINCPACAF). CINCPACFLT issued operational directives to Commander Task Force 77, keeping Commander Seventh Fleet informed. CINCPACAF issued operational directives to Commander Seventh Air Force, who was based in Saigon. Air operations in South Vietnam were directed by Commander U. S. Military Assistance Command Vietnam (COMUSMACV) through Commander Seventh Air Force. Thus Commander Seventh Air Force reported to two superiors and had two different groups of aircraft under him. The air force aircraft based in South Vietnam were used primarily in South Vietnam, while those aircraft based in Thailand were used in North Vietnam and Laos. Navy air operations in North Vietnam and Laos were coordinated with air force operations by a Commander Task Force 77 Coordinating Group, which was based with Commander Seventh Air Force in Saigon.[13]

Command and Control Structure

In early 1962, the "tactical Air Control System consisted of an Air Operations Center (AOC) and a Control and Reporting Center (CRC) at Tan Son Nhut airbase in Saigon; two Control and Reporting Posts at Da Nang in the north and at Pleiku in the center of the country," while by November 1962, air support operations centers in Vietnam were "established in each ARVN corps (military region), with operational responsibility for employment of air sorties allocated by the VNAF/2d Air Division Air Operations Center (AOC) in Saigon."[14] South Vietnam was divided into four military regions, numbered I through IV, and an air support operations center was established in each of these sectors to support VNAF operations.[15] By late 1965, air support operations centers were called direct air support centers and the air operations center became known as the central tactical air control center.[16] Additionally, the Air Force and the Marine Corps ran its own DASC in I DASC while in III DASC there was an additional DASC for US forces. The Marine Corps DASC was subordinate to the USAF-VNAF DASC. All US efforts to combine the DASCs met with resistance from the South Vietnamese.[17] In this case, host nation desires contributed to a fragmented command and control structure.

Not only did US forces lack a central tactical air control system, but so did the VNAF. Local air support operations centers, technically subordinate to the central air operations center at Tan Son Nhut outside Saigon each conducted its own air operations independent of the others and of the central air operations center. Air support operations centers did not act as schedulers and coordinators of Vietnamese air sorties, but instead as mission schedulers for the wings.[18] This was in part due to Vietnamese Army resistance to centralized control of air and its fear of losing control of air sorties.

The Air Force slowly began changing the Vietnamese's control system by using more forward air controllers to control air strikes, establishing an intelligence section to handle immediate air requests and forcing the VNAF to begin providing desired targets for strikes. As a result, the central system became more efficient which led the VNAF to finally adopt the USAF system of central control.[19] Vietnamese Army Corps no longer controlled its airpower independent of other areas.

Of significant importance to a well integrated and joint airspace control system was COMUSMACV's decision to direct that a US Army aviation operations center be collocated with the VNAF/US Air Force air operations center as a result of numerous uncoordinated helicopter assaults. "The commander of Army aviation would coordinate all helicopter assault operations."[20] The US Army also established "a tactical air support element (TASE) in Headquarters 2d Air Division to receive all requests for preplanned air support, place them in priorities, and pass them to the air operations center for execution."[21]

Airspace Control System in Vietnam and the Single Air Manager

As a result of service interests, airspace in Vietnam was divided into Route Packages, with Route Package I being in South Vietnam where ground forces were engaged with the enemy. It was in South Vietnam, and the focus of this chapter, that the TACS was extremely important to providing airpower to ground forces.

General Westmoreland was given operational control of Vietnam based aircraft, but did not control naval carrier aircraft[22] or aircraft outside of Vietnam such as those stationed in Thailand or Guam. Westmoreland delegated his operational control of Marine aircraft in I Corps to the Marine commander.[23] The Air Force controlled other

aircraft through the commander of the 2nd Air Division, located in Saigon.[24] As a result, prior to March 1968 there was no single tactical air control system in place, but rather two independently controlled tactical air control systems in South Vietnam: one operated by 7AF throughout the country and the other operated in I Corps by the Marines.[25] This would later affect air operations in South Vietnam and come to an apex during the battle at Khe Sanh. It took much to get the Marines to accept the concept of a "single air manager" even after General Westmoreland realized this would be the only way to maximize firepower for ground forces.

In 1965, General Westmoreland attempted to get Marine fighter aircraft in I Corp to coordinate their flights through the Air Force. They continued to be controlled by the Marine air ground system, which forced Westmoreland to direct that Marine and Navy air would be brought under the tactical air control system during emergencies.[26] That emergency would have to wait until February 1968 for the battle of Khe Sanh to force the concept of a "single air manager" and a single air control system for aircraft in South Vietnam. The Marines were able to sidestep General Westmoreland by petitioning this arrangement all the way to Admiral Sharp, CINCPAC, and won concessions that diluted the "single air manager" concept.[27] However, it was clear to General Westmoreland that a "single air manager" was necessary. The "single air manager" was not called a joint force air component commander at the time, but in function the intent was the same.

General Westmoreland had more success in integrating the Air Force tactical air control system and the Army's air-ground system into a joint air-ground system in May 1966. Liaisons between the Army and Air Force at each level from battalion to MACV

were established which facilitated enhanced coordination not only of air strikes from tactical fixed wing aircraft but also from artillery and helicopters.[28]

Khe Sanh

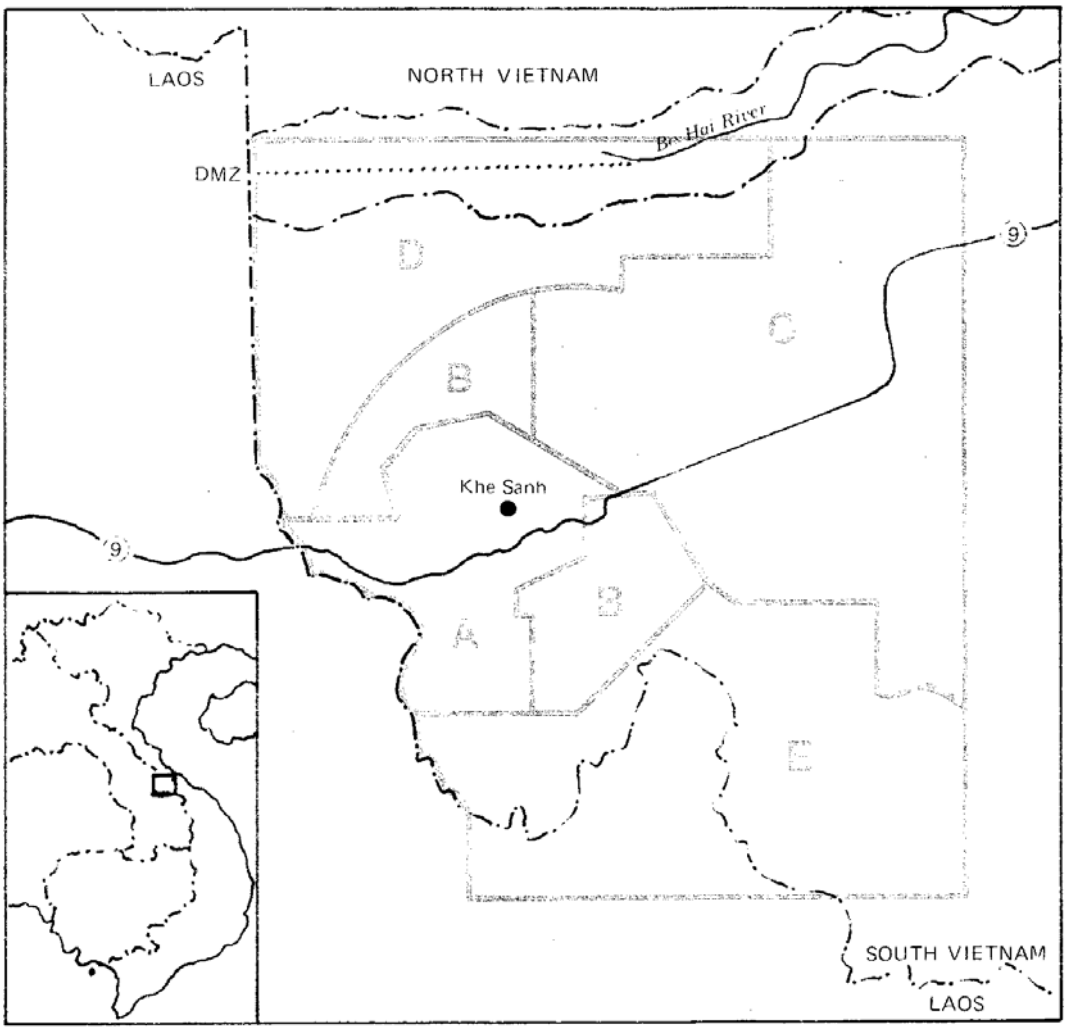
Until March 1968, "three separate American air forces continued to operate in South Vietnam; the Marines supporting their own ground troops; the Seventh Air Force, controlled by MACV; and the carrier-based naval tactical aircraft, which were outside MACV's jurisdiction."[29] The impetus for this change was the Battle of Khe Sanh. At the beginning of Khe Sanh, the Marines controlled all air strikes based on an agreement between the commanding general of III MAF and commander 7th AF.[30] Aircraft arriving on station checked in with the Marine DASC or ABCCC then headed off to a Marine Tactical Air Controller or Air Force Forward Air Controller to direct the air strike. The Marine Corps felt this method reduced the chances of hitting friendly troops.[31] During the battle, aircraft stacks would extend as high as 35K[32] for forward air controllers to control from either the air or the ground. The TPQ 10 radar was used by ground controllers to guide in aircraft.[33]

Vietnam saw the most significant changes in the development of fire support coordination measures.[34] These changes occurred in order to make artillery more responsive and to protect friendly aircraft. Artillery units were now required to transmit their firing data, to include the firing unit, the target, timing and maximum ordinance, to forward air controllers. Pilots were responsible to avoid these fires.[35]

The fire support coordination center, located at Khe Sanh, was the center of fire support to the base and handled the fire support coordination measures for the battle. Located within the fire support coordination center was the fire direction center. The fire

direction center used computers to assist in converting requests for artillery support into fire commands. The DASC, also located in the fire support coordination center, handled all requests for air strikes. Marines controlled sectors closest to Marine positions and where cleared to fire through the fire support coordination center and controlled either by an airborne tactical air controller or an airborne forward air controller.[36] Restricted fire areas were used around Khe Sanh that required coordination and control by the fire support coordination center. Free strike zones were controlled by 7AF and the ABCCC (Figure 7).[37]

"A temporary arrangement agreed to on 22 January between Momyer-Cushman representatives linked Seventh Air Force and Marine tactical air control networks, using an orbiting Air Force airborne battlefield command and control center (ABCCC) to achieve coordination of the massive air support laid on at Khe Sanh."[38] Although this was the case, "close air support of Marine ground forces was a job to be accomplished by the specialized members of the Marine air-ground team, while other air resources took on more distant targets."[39] The Air Force complained that Marine Corps pilots would ignore direction from the ABCCC. This was a source of friction because the Air Force argued that "unless there was close coordination between Marine Corps and Air Force, the flow of aircraft into the Khe Sanh area could not be regulated to avoid long delays for fuel-hungry jets and extended periods when aircraft would not be available."[40]



A and B	Restricted fire areas with air and artillery support coordinated and controlled by the Marines at Khe Sanh.
C	Restricted fire area with air and artillery support coordinated and controlled by the Marines at Dong Ha.
D and E	Free strike zones with air strikes controlled by the Seventh Air Force ABCCC

Figure 7. Fire Support Coordination Measures Around Khe Sanh
Source: John Schlight, *The War in South Vietnam: The Years of the Offensive, 1965-1968* (Washington, DC: Office of Air Force History, United States Air Force, 1988), 178.

Starting 14 February 1968, as a result of executing issues, COMUSMACV gave full responsibility for the air effort to Commander 7th AF through the ABCCC.[41] Finally

on 8 March 1968, because "General Westmoreland considered it 'of paramount importance to achieve a single manager for control of tactical aircraft sources,'"[42] he designated General Momyer as the "single manager" of fixed-wing tactical fighter and reconnaissance air operations in South Vietnam.[43] This was applied to South Vietnam and did not extend to operations in North Vietnam where the Air Force and Navy divided the north geographically to deconflict air operations between the two services. General Momyer was given the responsibility to coordinate and direct all fixed-wing tactical fighter and reconnaissance air efforts which made it possible for him to manage the total force more effectively and as the ground situation dictated.[44] Some unity of effort in South Vietnam was finally achieved.

Elements of the Joint Air Control System

By 1966, the Air Force's tactical air system had evolved to consist of direct air support centers, radar control posts, forward air controllers and the Skypot radar system.[45] Earlier in April 1965, the EC-121 was introduced, but only for operations in North Vietnam and the Gulf or Tonkin and not for operations in South Vietnam. By 1968 the ABCCC was included into the system.

Forward Air Controllers

America's increasing involvement in Southeast Asia highlighted the growing need to have trained personnel to operate a Tactical Air Control System. The first TACS elements, manned by quickly trained personnel, began deploying to Vietnam in 1961. [46] The first of these were involved in Operation Ranch Hand. By early 1963, Ranch Hand

aircraft were flown low level, simulating hostile aircraft in order to train and develop the new ground control capability develop in South Vietnam.[47]

Requirements in Vietnam demanded larger numbers of forward air controllers (FACs) than in earlier wars. Rules of engagement designed to prevent civilian casualties from air strikes required approval by Vietnamese authorities as well as FAC control to release ordinance.[48] As a result, as in World War II and Korea, the ground FAC was introduced once again along with the concept of the airborne FAC that was developed during the Korean War.[49] After the Korean War, the Air Force neglected this capability. It not only found itself quickly having to train personnel for this role, but it also had to acquire the aircraft. In March 1965, the Air Force only had 23 O-1 Birddogs; the Army provided the Air Force with an additional 106.[50] The FAC, both ground and airborne, would become an integral part of the TACS during the Vietnam War, providing highly reliable and expert targeting in support of US ground forces.

TACS Equipment

Prior to the start of the Vietnam War, the state of the Air Force's Tactical Air Control System was not well developed due to reductions in personnel, air and ground equipment, and training after the Korean War. [51] The Air Force, partly as a result of its focus on the nuclear threat and its insistence "that strategic nuclear forces provided the best instrument to prevent nuclear war,"[52] invested little in the equipment and training required to properly field a TACS. The Marine Corps, on the other hand, was best prepared with regards to equipment and personnel needed to control aircraft, but did not have the capacity to direct the multidimensional air campaign that developed in Southeast Asia.[53]

Distance and terrain allowed US ground-based radar systems in Thailand and South Vietnam to control most air operations south of the 19th parallel. North of the 19th, these ground based radar systems and the Navy's early warning ship, USS Long Beach, but call the PIRAZ, could not see more than 50 miles. Around Hanoi, air traffic could only be seen if it was above 10,000 feet. To compensate for these gaps in radar coverage EC-121 aircraft from Air Defense Command were sent to Vietnam in April 1965. The EC-121 flew over the Gulf of Tonkin to cover operations north of the 20th Parallel.[54] Soon, the EC-121 was being suggested to be airborne at all times to serve as an airborne control center for immediate air strikes. EC-121 radios and radar were not optimized for aircraft control but rather for early warning.[55]

In October 1968, the Air Force deployed its experimental EC-121M equipped with a more advanced airborne radar and identification, friend or foe system and authorized it to provide warnings directly to the F-4 and F-105s.[56] The EC-121 "served as an airborne command and control center and handled the execution of orders from the special advanced headquarters of the Seventh Air Force known as the Tactical Air Control Center (TACC) North."[57] These orders involved providing early warning of enemy threat aircraft. One of the major disadvantages of the EC-121 was its radar. It was excellent over water, but did not have a "look down" capability and was poor at detecting low flying traffic due to ground clutter.[58] By 1972 the Air Force deployed the newer EC-121T, equipped with upgraded radar, but it too was affected by ground clutter and required additional information to complete its "air picture."[59] It would be many more years before the Air Force would field the E-3 Sentry AWACS, which had a true long

range “look down” capability. By March of 1972 though, the EC-121 was involved in controlling aircraft on strike, escort and photo flights.[60]

The TACS system evolved in regards to communications and computers. By 1972, the Air Force was able to control of aircraft through the EC-121 and use integrated radar feeds and “intelligence information into a single facility.”[61] The beginning of the modern TACS was underway by the end of the Vietnam War.

The ABCCC was used extensively to control air strikes. The ABCCC did not have a radar so it used procedural control. Aircraft checked in with the ABCCC and were either sent directly to their target or sent to a forward air controller (airborne) for targeting.[62] ABCCC and forward air controllers controlled aircraft not only in the close air support role, but also in the interdiction role against vehicles, storage areas and lines of communication.[63] The ABCCC was used to orchestrate air operations to include controlling air refuelings, racking and stacking fighters, and handing them off to forward air controllers. General Momyer viewed the success of the ABCCC in handling these tasks using Air Force, Navy, Marine and South Vietnamese aircraft, after successful operations at Kham Duc, located south of Khe Sanh, as vindication of the single air manager system.[64]

The Marines operated a mobile radar, the TPQ-10, out of many of their bases to include Khe Sanh. These ground radar stations where limited by physics; the further out from its location the less low level targets could be seen.[65] Mountainous terrain also contributed to a reduction in coverage. Marine Corp controllers, though, were highly skilled and the Air Force Liaison at Khe Sanh praised their skill in directing airstrikes as close as 50 meters from friendly ground troops during emergencies.[66]

The Air Force also used ground radars similar to those used by the Marine Corps to control aircraft throughout South Vietnam, but it also developed and deployed the MSQ-77 Combat Skypot. This radar had the ability to take an aircraft heading, speed and altitude to assist the ground controller in determining when an aircraft should release ordinance to hit a particular target. This radar was critical during bad weather when airborne forward air controllers were not available.[67]

The Navy operated an early warning radar ship, the USS Long Beach, from the Gulf of Tonkin to provide control in an area the Navy called a Positive Identification Radar Advisory Zone (PIRAZ).[68] The Navy and Air Force integrated their systems (ship and airborne platform) to complement the other's capabilities. The early warning radar ship was more effective over water and the EC-121 was more effective over land despite its radars ability.[69]

Conclusion

This chapter highlighted some very important facts regarding the JFACC's role as ACA during stability operations. First, centralized control is necessary to maximize airpowers use across the area of operations. At Khe Sanh, the Air Force insisted being linked with the DASC in order to assist with sequencing aircraft for operations at Khe Sanh, manage fuel and handle air requests in other parts of South Vietnam. This same idea will be replayed during Fallujah II in November 2004 in Iraq, but with true joint integration between the Air Force and Marine Corps. Second, interservice agreements that resulted in joint exercises were highlighted. These exercises resulted in the Air Force and Army developing procedures to solve interoperability problems. This parallels Operations Enduring Freedom and Iraqi Freedom where the services worked to solve

interservice issues. These are discussed in the next chapter. Third, the Air Force needed a robust air control system to handle operations across Vietnam. At the beginning of the war, the system was not prepared, but by the end of the war, the system was robust and set the conditions for the development of critical force multipliers such as the AWACS and JSTARS while illustrating the value of an ABCCC. Finally, the division of air control over Khe Sanh is an example of delegating airspace control authority to the lowest echelon capable; in other words, decentralized execution. This concept will be replayed during Fallujah II

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CHAPTER 4

OPERATIONS ENDURING FREEDOM AND IRAQI FREEDOM

Introduction

This chapter mirrors the format and topics discussed in chapter 3, but using the Operations Enduring Freedom and Iraqi Freedom as the case study on the use of airpower in support of ground forces during both conventional and unconventional operations. The Elements of the Joint Air Control System were discussed in chapter 2 and will therefore not be discussed again in this chapter.

Interservice Differences and Cooperation

Just as prior to the Vietnam War and during the Vietnam War, there were interservice differences and cooperation prior and during Operations Enduring Freedom and Iraqi Freedom. Some were left over from the Korean War (Air Force control of Marine Corps air) and some were even older, needed congressional action to force the services to change (Goldwater-Nichols Act 1986). Other areas of cooperation grew from the lessons gleaned from operations in Afghanistan and Iraq.

ASOC Enabling Concept

On 1 June 2006, the Air Force Chief of Staff, General T. Michael Moseley, signed the "United States Air Force Air Support Operations Center Enabling Concept." This ASOC enabling concept is a result of the lessons learned from Operations Enduring Freedom and Iraqi Freedom and "outlines the mission, functions and responsibilities of the air support operations center (ASOC)."[1] It is an attempt to more deeply integrate the ASOC with the AOC in order to quickly respond to air and space power requests. "The

ASOC must effectively command and control combat air and space power at the time and place needed to achieve land and air component commander's objectives. Furthermore, it must be capable of orchestrating the rapid destruction of emerging enemy targets in a fluid maneuver environment. Finally, it must efficiently use air and space power to provide support in any area of operation (AO) in accordance with the ground commander's intent."[2] This includes both major combat operations and stability operations. In order to accomplish these tasks the ASOC Enabling Concept addresses the need for joint training, the proper equipment needed to integrate fully into the joint air control system, and the inclusion of air battle managers.[3] An air battle manager is the Air Force's career field trained in airspace control and management. They man the E-3 AWACS, E-8 JSTARS, CRCs, and formally the retired ABCCC aircraft. They bring airspace control expertise to the ASOC. The ASOC Enabling Concept is another evolution in the attempt to more deeply integrate air and ground operations in order to maximize the application of airpower and enhance airpower's responsiveness to ground operations.

JTAC Schools

Another area of improvement since the Vietnam War and occurring during Operations Enduring Freedom and Iraqi Freedom is the unprecedented cooperation among the services and Special Operations Command (SOCOM) regarding joint standards for close air support. Effective 1 Septemebr 2004, the services and SOCOM agreed under the "Joint Close Air Support (JCAS) Action Plan Memorandum of Agreement (MOA) 2004-01 Joint Terminal Attack Controller (JTAC)(Ground)" to implement the standards for JTAC certification outlined in JP 3-09.3 (Joint Tactics,

Techniques and Procedures for Close Air Support, 3 Sep 03). This is extremely important to the ability of the Theater Air Ground System because it standardizes training and certification for JTACS so that all JTACS undergo the same training and currency requirements. It also standardizes terminology. Second, coupled with the ASOC enabling concept it could be the beginning of a process that more closely integrates each service's air control system into a truly joint and seamless air control system.

1986 Omnibus Agreement

The 1986 Omnibus Agreement was an attempt to quell interservice rivalry between the Air Force and the Marine Corps. The Agreement only partially succeeded in that endeavor; the experience of Vietnam influenced operations during Operation Desert Shield/Desert Storm. The following is an excerpt from the Operation Desert Shield/Desert Storm After-Action Report by the Marine liaison to the CAOC.

> During Desert Shield/Storm it was apparent that the Marine Aircraft Wing was reluctant to become part of the overall air campaign in concert with the other theater air assets. Much of this was due to the inherent fear of the Air Force control fostered by Southeast Asia, and the need to demonstrate MAGTF [Marine Air/Ground Task Force] control over its own air assets. Another related reason is the inherent distrust of Air Force intentions to control the destiny of Marine air vice the coordination of the air campaign. To those that had day to day dealings with the Air Force it became readily obvious that the JFACC's primary concern was to coordinate the efforts of theater aviation, deconflict airspace, and increase the efficiency of the air campaign. The 1986 Omnibus Agreement was often used as a weapon by the Marine Air Wing to maintain its aloofness from the coordinating effort of the JFACC. Marines have maintained that the JFACC's role, as defined by the Air Force, was to "control" Marine air. The Marine definition has maintained that the JFACC's role is strictly to coordinate the effort. In fact, it was the Marine definition of the JFACC that came to pass. Even so, the Marine Aircraft Wing maintained its detachment from most of the coordinating effort initiated by the JFACC. Eventually, it was the Marine Aircraft Wing that created the animosity and distrust that will come back to haunt future joint operations. Joint operability is a fact of life that we as Marines need to learn to live with. By our nature and diversity we should be the best at it . . . . But in our conduct of joint warfare we do not show that we are independent and, therefore,

> not redundant; we demonstrate that in a joint environment the MAGTF cannot be counted upon to increase the synergism of the joint command, thereby making us an inefficient part of the whole and therefore, expendable.[4]

As is clearly seen, old interservice doctrinal issues still remained.

New Omnibus Agreement

JP 0-2, *Unified Action Armed Forces (UAAF)*, 10 July 2001, has superseded the Omnibus Agreement and is a further attempt to resolve interservice doctrinal issues and enhance joint operations. This agreement affirms "the MAGTF commander will retain OPCON of organic air assets,"[5] but "will make sorties available to the JFC, for tasking through the joint force air component commander (JFACC), for air defense, long-range interdiction, and long-range reconnaissance. Sorties in excess of MAGTF direct support requirements will be provided to the JFC for tasking through the JFACC for the support of other components of the joint force or the joint force as a whole."[6] Importantly, the JFC can still exercise OPCON of Marine Corp air assets and assign them to higher priority missions. Additionally, the JFC can direct coordination among the subordinate commanders to ensure unity of effort in accomplishment of the overall mission, or to maintain integrity of the force."[7] The importance of this agreement is that the Marine Corp still retains control of its' organic air for MAGTF operations, certain sorties go to specific joint missions, and the JFC can direct forces as needed. The explicit authority should prevent future disagreements between the services that could hamper operations regardless of any service's position. The negative aspect of this agreement is that there is still a divide between the service on sortie allocation and apportionment that has the potential to spill over into other areas such as airspace control.

Theater Command and Control

Interservice rivalries and doctrinal differences, coupled with the failures of Desert One in 1980 (the failed Iranian hostage rescue) and extensive joint integration problems during Operation Urgent Fury in 1986 (the invasion of Grenada), resulted in Congress passing the Goldwater-Nichols Act in 1986. The Goldwater-Nichols Act of 1986 contained eight congressionally declared purposes of which three are important to this study. The first was making the Chairman of the Joint Chiefs of Staff the principle advisor to the President. Before the Goldwater-Nichols Act, all service chiefs could advice the President. A single advisor to the President was intended to improve the quality of advice and remove the lowest common denominator factor in decision making. Essentially, making the Chairman of the Joint Chiefs of Staff the principle advisor to the President worked to reduce much of the service parochialism as compromises could not be made between the service chiefs. The second change was cleaning up the operational chain of command. Before Goldwater-Nichols, the service chiefs could insert themselves into the chain of command. Now the chain of command ran from the President to the Secretary of Defense to the regional or functional commander. Since the service chiefs were removed from the chain of command; they essentially became the force providers. Finally, Goldwater-Nichols made joint education and assignments a requirement for flag officer rank. This move helped to weaken service interests and strengthen joint interests. In the past, officers eschewed joint assignments because it did not get them promoted and this system added to service parochialism. The Act made joint service desirable and led to a noticeable increase in joint thinking. The Act broke down service barriers, and led to

a new generation of officers accustomed to working closely with sister service officers for a common goal.[8]

As a result of the Goldwater-Nichols Act, by the time Operations Enduring Freedom and Iraqi Freedom occurred, the problems of multiple chains of command at the theater level did not exist. The command and control system was not divided as it was in Vietnam. As discussed in chapter 2, there was now a "single air manager," the JFACC, who reports to a single joint force commander, in this case CENTCOM. The CENTCOM commander in turn reports directly to the Secretary of Defense, who in turn reports directly to the President. Goldwater-Nichols ensured this chain of command did not include the service chiefs in order to streamline the command structure and to prevent parochial service interests from affecting theater execution decisions.

Command and Control Structure

Air operations over Afghanistan and Iraq were centrally planned and controlled by the JFACC from the CAOC, initially from Prince Sultan Air Base, Saudi Arabia and then from Al Udied, Qatar. The JFACC reported to the joint force commander, in this case CENTCOM. Unlike during the Vietnam War, the command and control system was not divided or fragmented. The JFACC was the "single air manager," thus achieving a unity of effort not achieved during the Vietnam War.

By September 2001 the TACS consisted of an AOC, located at Prince Sultan Air Base, Saudi Arabia and a CRC located in Kuwait. E-3 AWACS were also a part of the system having been in theater flying no-fly-zone operations in Northern and Southern Iraq since the end of the first Gulf War. Navy E-2 Hawkeyes were also part of the system.

Based on the location and lack of conventional ground forces in Afghanistan, the joint air control system consisted of the CAOC, the E-3 AWACS, E-8 JSTARS, E-2 Hawkeye, TACPs assigned to SOF units and forward air controllers. Prior to Operation Anaconda, the ASOC was not used. Once the ground environment became permissive, CRCs were deployed to Afghanistan. E-3s and E-8s were occasionally used and then not at all as preparations for Operation IRAQI FREEDOM began. The same elements available for Operation ENDURIGN FREEDOM were available for Operation Iraqi Freedom. Glaringly absent from both operations was the recently retired ABCCC.

An example of the capability a CRC can provide is found with the 727th Expeditionary Air Control Squadron's. The 727th organic radar capability provides the ability to command and control over 180,000 square miles of airspace. With feeds from other radar sites across Iraq, it can increase that volume to over 270,000 square miles for the Control and Reporting Center to use in controller aircraft. This information is also linked to the "CAOC, ground and air forces and to other deployed radar sites."[9]

As seen in chapter 2, the Marine Corps has the capability to provide positive and procedural airspace control in its area of operations and has organic fixed wing aircraft whereas the Army must rely on the Air Force to provide positive control and close air support. As a result, a habitual relationship between the ASOC/CAOC and III Corps and thus the JFEC developed during Operation IRAQI FREEDOM. No such relationship was to develop or exist with the Marine Corps and their DASC. On the other had, the 3d Air Support Operations Group (ASOG) was fully integrated, aligned and functionally integrated into MNC-I's joint fire and effects cell.[10] This in turn led to increased trust and understanding and a full integration of Air Force and Army capabilities. Integration led to

significant improvements in responses to troops in contact (TIC). "Ultimately, air-ground teamwork combined with perceptive intelligence work to reduce average TIC responses of 20-25 minutes in the summer of 2004 to six to seven minutes throughout November, December [2004] and January [2005]."[11] A joint system that integrates all the services would increase trust and understanding across all services, thus hopefully leading to improved joint operations.

Reciprocally, the BCD, located in the CAOC, was a critical link for the ground commander. The BCD played an important part in setting airspace priorities and managing competing priorities, especially in an extremely congested environment that continues transitioning from wartime to peacetime in the future.[12] Col Waring, a previous commander of the 19th BCD, located at Al Udied AB, Qatar during 2004-2005 stated:

> The complexity of airspace management is immense. It equals the level of coordination required to clear counterbattery fires in battlespace that is occupied by Army, Marine, Air Force and Navy forces plus Coalition partners, a plethora of unmanned aerial vehicles (UAVs), commercial airline traffic and special operations aircraft. Then add a credible ground-to-air threat and place the Hot Platoon inside what normally would be considered Class B airspace due to the high density of air traffic. At the same time, the air traffic command and control facilities are partially manned by host nation operators because they own the airspace.[13]

Col Waring's detailed description of what is occurring further demonstrates the need for joint integration and the tools necessary to manage the multitude of operations occurring simultaneously.

Additionally, close coordination between the Air Force and Army through a fully integrated joint fire and effects cell led to clear priorities. These priorities "enabled the CAOC, a CENTCOM [Central Command] asset, to determine when to surge aircraft at what times and over which locations to maintain an appropriate troop-in-contact, or

"TIC," response." These clear priorities increased airpower's flexibility because if air was prioritized for Fallujah and Baghdad and something occurred in Mosul the air command and control system could flex from one location to another in response to a TIC. "The JFEC representative in the current operations section of the JOC [joint operations center] could make those decisions. The ASOC in the JFEC always had radios blaring in constant contact with the pilots and could immediately divert an aircraft to a higher priority mission."[14] This is another example of how close integration increased trust and the effectiveness of joint air operations. Not only is close integration through the ASOG and BCD necessary to flex airpower from one area to another, but also a robust air control system is needed to command and control the assets, deconflict from civil and military traffic, and provide the necessary information on new targets to pilots as they flow to their new priority. General Formica highlighted this point, "As we examine how we must change to get better, we need to be less ad hoc and more deliberate in the design of the JFEC. That said, the overarching lesson learned is that a coherent JFEC enabled the corps headquarters to synchronize lethal fires and nonlethal effects. We learned the value of having FA fires, the ASOC, IO and, potentially, civil-military operations [CMO] incorporated into one coherent cell under a senior joint fires and effects coordinator while distributed among the command posts for planning and execution."[15]

Fallujah

Fallujah II, or Operation Al Fajr was conducted from 8 to 30 November 2004.[16]

The Marine Expeditionary Force (MEF) has historically operated autonomously due to its ability to control its organic fixed and rotary wing assets. In August 2002 Marine and USAF planners reached an agreement to integrate MEF airspace into the

ACP.[17] Regardless of whether or not the MEF retained control of airspace within its area of operations, all airspace should be under a central authority to ensure all airspace users are aware of airspace coordination measures throughout the theater. Joint cooperation and integration had finally evolved to make this a reality.

In preparation for operations in Fallujah, air planners began the process of thoroughly planning all the required airspace control measures. These ACMs would allow for the freedom of movement for air assets in order to support ground operations.[18] Since Fallujah was in the Marine sector, the Marines chose to provide their own airspace control assets. Since Fallujah II was a joint operation, a joint solution was required to integrate I Marine Expeditionary Force into the theater ACS. Col Belote's (the 3d ASOC commander's) tone in "Air Ground Integration for the Long War" suggests there was some friction with regards to how airspace control would unfold for airspace over Fallujah.[19]

Eventually, the Marine Corp, Army, and Air Force worked out a solution giving the Marines control over all air around Fallujah but still kept the ASOC completely informed on DASC operations.[20] Thus, the I Marine Expeditionary Force was delegated airspace control authority around Fallujah.[21] This arrangement worked well for several reasons; it provided a single manager for air in an area or sector, ensured air operations within that sector did not operate without consideration of other insurgent attacks across the country and ensured combat power could be focused on the main effort, which at the time was operations over Fallujah.[22] Finally, this action is in line with delegated control to the lowest echelon capable or decentralized execution.

This arrangement worked to the satisfaction of all the services engaged. The Marine Corps and the Air Force had a single manager for operations around Fallujah, but by being linked and having access to all the data in the DASC, the ASOC was able to anticipate the DASCs needs and maximize the effects of airpower.[23] One way it did this was by continuously monitoring the Joint Air Request Net and begin positioning aircraft for use over Fallujah. This net linked battalion, brigade and division TACPs.[24]

Prior to operations in Fallujah, the Marine Corps thoroughly planned the airspace control measures. A High Density Airspace Control Zone (HIDACZ), 30 nautical mile diameter and 30,000 feet high was established over Fallujah.[25] A HIDACZ is an area where there is a concentrated employment of numerous and varied weapons and airspace users. Access is normally controlled by the maneuver commander who can direct a more restrictive weapons status within the designated area."[26] The DASC controlled all air activity from 25,000 to 30,000 feet. Below 25,000 feet, control was exercised by joint terminal attack controllers.[27] "The extremely crowded airspace in and around Fallujah was controlled using a non-doctrinal "keyhole" measure that simplified the deconfliction of fixed- and rotary-wing attack aircraft, UAVs and indirect fire."[28]

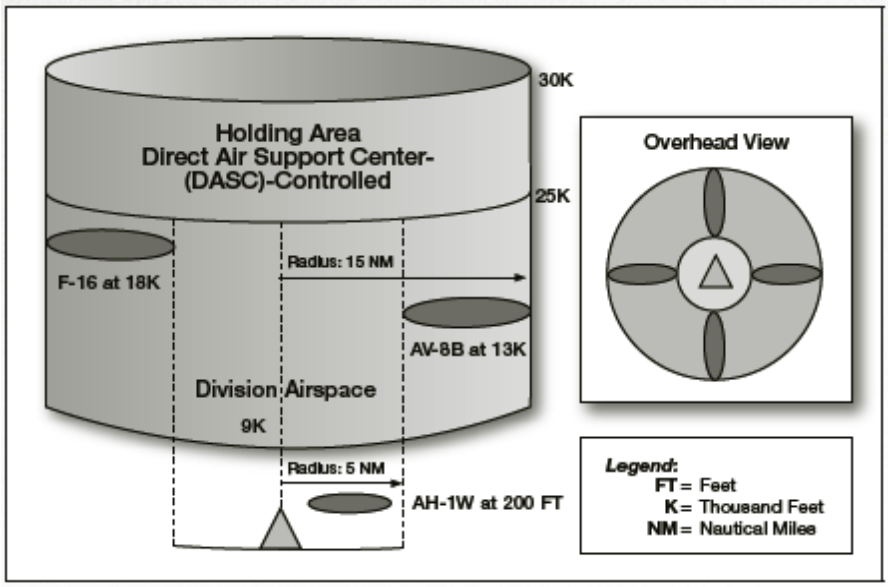

Figure 8. Notional Keyhole CAS
Source: Keil R Gentry, "RCT-1 Fires in the Battle of Fallujah," *Field Artillery Magazine*, November-December 2005,. 27.

The keyhole concept allowed high performance aircraft to operate over and 5 miles around Fallujah with aircraft waiting at the four cardinal directions to be feed in as needed.[29] This setup requires the multiple TACPs controlling aircraft to be completely aware of each other's location and their sectors of responsibility. The aircraft density of the HIDACZ could make the employment of particular weapons more difficult due to weapons release parameters and angles of attack.

Aircraft were deconflicted "by time, altitude blocks, and ingress and egress routes." The stack of aircraft from low to high altitude looked like an upside down cake. Air Force, Navy, and Marine fighters were on call for specific time periods, 24 hours a day, for use by special operations forces, Air Force, and Marine Corps tactical air controllers.[30]

The "1st Mar Div employed standard fire support coordinating measures (FSCM), including no fire areas (NFAs), restricted fire areas (RFAs) and coordinated fire lines (CFLs)."[31] As seen in chapter 3, these fire support coordination measures have not changed much since their development in Vietnam.[32] The air support liaison team would attempt to clear the airspace for artillery support, but if it could not, then the fire support coordination center ended the fire support mission.[33]

The common grid reference system was also used in order to provide a common frame of reference, making it easier to move air assets from one area of the country to another. The common grid reference system is a method of dividing an area using alphanumeric designations. This resulted in increased responsiveness to requests for airpower to assist troops in contract.[34]

At the same time operations occurred over Fallujah, other operations were still being conducted throughout the battlespace. General Formica, Commander of the Force Field Artillery Headquarters and Joint Fires and Effects Coordinator, Multinational Corps Iraq, expected insurgent activity from Fallujah to spill over into other areas so the ASOC was tasked to established close air support procedures in order to respond rapidly

> to troops in trouble in key areas on the ground, such as in Mosul, Baghdad and out to the west by Al Qaim. That allowed IMEF air assets to focus support on Fallujah. The corps ALO [air liaison officer], Colonel Dave Belote, did a tremendous job of working with the MEF's Marine air wing to support the air battlespace over Fallujah. As a result, the MEF was able to optimize the capabilities and employment of joint air assets and UAVs [unmanned aerial vehicles] and have the right airspace control measures in place. One of the corp's strengths in Fallujah was the integration of joint fixed-wing assets, including the incredible AC-130 CAS platform that worked so well with our SOF and at night. Air power was responsive and precise in Fallujah. We also shot a lot of precise Army and Marine Field Artillery in Fallujah, most of it in very close support of troops in urban operations.[35]

Intelligence, Surveillance and Reconnaissance (ISR) over Fallujah highlighted ISR's importance to stability operations. It played an extremely important role to Fallujah's success. If Fallujah is any indication, more and more ISR assets will be placed in the air, further congesting the airspace in a relatively dense area. Strike sorties in Fallujah were flown at a 2:1 ratio over ISR sorties highlighting ISR's importance. Historically, strike sorties were flown at a 12:1 ratio.[36] This means more aircraft saturating the airspace then has historically been the case, compounding the deconfliction problem.

Unmanned aerial vehicles were also used extensively over Fallujah. They played a key role in providing persistent ISR. Persistent ISR is a critical element to success during both major combat operations and stability operations. Increasing demands by commanders at all levels for information will add to the number of unmanned aerial vehicles already flying thus compounding the airspace problems that already exist today unless a solution is found. As of early 2006, the services are reportedly flying approximately 1,500 unmanned aerial vehicles and hundreds of smaller hand launched unmanned aerial vehicles.[37] Unmanned aerial vehicles, manned aircraft conducting ISR, and close air support aircraft must be decondlicted whether procedurally or through positive control. In an environment such as Fallujah, the degree of airspace saturation will require not only well defined air control measures, but also the means to control the plethora of aircraft. Lt. General Buchanen, the combined force air component commander, highlighted the potential problem, "my fear is the day will come when we have a C-130 full of troops and there will be a Scan Eagle, a Pioneer, whatever, is going to come through the cockpit and take out a C-130 because we did not deconflict."[38]

However, the grid box system used to deconflict airspace for unmanned aerial vehicles[39] may not be sufficient in the future as more unmanned aerial vehicles are used at various echelons and continue to saturate the airspace.

Fallujah was truly a joint operation. Air Force and Marine TACPs were involved, as well as special operations forces, Army and Marine Corp ground units. According to Gen Formica, the main joint fires delivered were air delivered munitions from the Air Force, Navy and Marines.[40] By the end of the operations, there were 76 artillery calls for fire and 135 close air support mission flown for a total of 1898 artillery shells and 218,000 pounds of ordnance.[41]

Conclusion

This chapter highlighted some very important facts regarding the JFACC's role as ACA during stability operations. First, the concept of centralized control continued to be critical in maximizing joint airpower. Linking the DASC with the ASOC played a critical role in maximizing and sequencing joint airpower over Fallujah while still providing air power across Iraq to other ground operations. Second, some the service initiatives are leading to deeper integration between the services. This includes personnel, joint training and a common language for joint terminal attack controllers. Third, the Air Force did not have an ABCCC and the E-3 AWACS has been unavailable since the end of major combat operations in Iraq. JSTARS cannot be everywhere and its mission is not that of the ABCCC. An analysis of whether or not it would have been an effective tool during Fallujah is a topic for another thesis, but based on the experience in Vietnam, it probably would have been a force multiplier. Finally, the division of air

control over Fallujah, Iraq was again consistent with the concept of decentralized execution at the lowest echelon capable.

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CHAPTER 5

CONCLUSION

What is the role of the joint forces air component commander as airspace control authority during stability operations? The role of the joint forces air component commander as airspace control authority during stability operations is essentially no different than during major combat operations although, there are different considerations. As JP 3-30 states, "[T]hough missions vary widely across the range of military operations, the *framework and process for C2 of joint air operations are consistent.*[1] Both major combat and stability operations require a "robust air-ground command and control system."[2] Currently, there are several issues that prevent the system from being as robust as required. Based on the research discussed in this thesis several conclusions are drawn to make the system more robust. These conclusions can be applied to both major combat operations and stability operations. Four conclusions are drawn; improve doctrine, improve equipment, conduct more joint training, and develop communication and terminology standards. Improving these four areas will significantly enhance major combat and stability operations and lead to improved joint operations.

Conclusion 1

Joint doctrine must include more information on transitioning from major combat operations to stability operations such as what occurred in Iraq. It must also discuss establishing a joint air control system for stability operations without prior military operations such as Indonesia in 2005. Joint doctrine should address, in more detail, integrating the joint air control system into a nation's civil air traffic control system,

either by creating the system where none existed or by integrating into an existing system. Issues to address include both data and communications connectivity between the joint air control system and the civilian air traffic control system. Liaison functions and establishment must also be addressed. Liaisons are especially important if there is no connectivity between data and communications systems. These liaisons are necessary to ensure the airspace control plan contains all civilian airways, civil restricted areas, military airspace, and the necessary military air control measures needed to support stability operations.

Civil authorities must also be aware of military airspace control measures. On many stability operations, civil air traffic authorities will probably have the authority to deny or authorize military airspace requirement requests. Restricted operating zones cannot be permanent, especially as the airspace reverts back to civil authority. Assisting a nation create and sustain its air traffic control system is a viable, necessary, important sign of sovereignty, and a large contributor to stability operations. New joint doctrine may be addressed in a document that merges airspace control with military air traffic control and airfield operations. In this manner, the issues required to address the full spectrum of air operations, to include from entering an area of operations airspace to operating from bases in the area of operations are addressed in one document.

Additionally, joint doctrine should explicitly state that airspace control should be centralized but decentrally executed at the lowest possible echelon consistent with the control capabilities available and desired by the joint forces air component commander. According to the Air Force's "Expeditionary Wing Leadership Lessons Learned Exit Interviews," summer 2005, air traffic control doctrine and combat airspace doctrine do

not co-existing well within the AOR. The recommendation is the CAOC should have the lead on developing the airspace plan and how the civilian aspects of air traffic (commercial flights, cargo, etc) are to co-exist with the combat airspace and combat missions going on around airfields in Iraq.[3] This recommendation highlights an obvious disconnect between doctrine and execution and should be addressed. A joint solution is required because common procedures are necessary across the joint force. Detailed and complete doctrine integrating civil and military airspace considerations during stability operations will provide the JFACC an appropriate tool to effectively function as the airspace control authority during stability operations.

Conclusion 2

In addition to the joint airspace control doctrine all services must comply with, the joint forces air component commander requires the appropriate equipment to effectively execute the duties of airspace control authority during stability operations. As noted in Chapter 2, joint doctrine does not dictate the type of equipment, but rather relies on the services to procure what each service deems necessary to completer the airspace control function. In order for the JFACC to effectively function as airspace control authority during stability operations, the joint force requires more and better equipment than exists today. If the Air Force expects to take the lead and provide the backbone of the joint air control system, the Air Force must provide the means to do so. The Air Force must invest more in the TACS than it has in the past decade. The Air Force requires sufficient equipment and personnel to provide control, more specifically, positive control throughout the theater of operations. Defined airspace boundaries, whether divided horizontally or vertically, should be established not only by the need but also by the

ability to effectively control the airspace. If the Air Force wants to take the lead and effectively control the airspace across the entire spectrum of air operations it must have the ability to do so. As discussed in Chapter 1, during major combat operations, the E-3 AWACS is deployed and provides the joint air control system with the capability to positively control large amounts of airspace. When these operations are complete, the E-3 AWACS normally redeploys and the task of providing positive control falls to ground based radars within the CRCs that are most likely already providing positive control in theater. The problem is there are not enough CRC units to provide the necessary positive control needed by the Army or to augment the Marine Corps in their areas of responsibility. There are several possible solutions to this problem. The first is to develop highly mobile ground radar equipment requiring a small logistics footprint to function. It may be best to incorporate this capability into the ASOC structure. This arrangement would enhance the ASOC's ability to control airspace. As part of the ASOC they could use many of the ASOC support functions such as security, thus minimizing the logistical footprint. This solution could also easily become an extension of the Air Force's ASOC Enabling Concept already discussed in Chapter 4. A second solution is for the Air Force to develop an unmanned aerial vehicle with an electronically scanned phased array radar. The radar picture provided by such a platform could be data linked to ground controllers within or outside the theater of operations to provide control as required. This solution would also provide persistent surveillance and reduce the strain of personnel. Bandwidth for the data and communications requirements would be an issue to address. Such a solution may also bring more fuel efficient systems into the inventory, addressing a major issue as fuel prices continue to rise. "The amount of time the USAF devotes to such

operations [peace operations] has exploded from almost zero during the last few years of the cold war to a level that has been consuming almost 10 percent of Air Force flight hours in the mid-1990s."[4] The third solution entails purchasing a smaller airborne early warning (AEW) manned platform similar to the Australian or Korean Boeing 737 or an Embraer based AEW aircraft. This smaller AEW aircraft could be used for small scale contingencies in a low threat environment, have a smaller crew, smaller maintenance requirements, and thus a smaller footprint. It would need to be designed to provide basic air control functions and avoid the tendency to create an aircraft that can do everything. This solution would probably be the most expensive due to aircraft, training, maintenance and personnel costs. An analysis of which solution is the most cost effective for the desired requirements is not within the scope of this thesis.

Although not an aircraft that can provide positive control, an ABCCC aircraft is needed within the joint air control system. Desert Strom demonstrated that "because the ABCCC was airborne, it was able to communicate with and manage tactical forces operating beyond the normal communications coverage of other tactical air control system elements, such as the Air Support Operations Center and the Control and Reporting Center."[5] The ABCCC provided an extremely important function. It essentially served as an airborne information manager. The ABCCC function could also be based on an unmanned aerial vehicle. The dynamics of stability operations and its non linear nature clearly point to the need for a robust air control system that can effectively and efficiently provide the necessary control during stability operations. The Air Force should take the lead with this endeavor.

Conclusion 3

Joint training is an area requiring continued improvement. Airspace users from all services must be aware of the complexities of airspace management. Airspace users must be aware that although they may not see other airspace users, they do exist and their actions could impact operations. This issue is slowly being addressed as demonstrated by the commanding general of the National Training Center at Fort Irwin, Brigidaer General Robert Cone "One thing we find is when a unit comes out here, and they bring all these UAVs…there's a problem of airspace control." Soldiers are learning about and practicing airspace coordination procedures.[6]

Joint exercises such as the Air Warrior Exercise conducted at the National Training Center at Ft Irwin and Air Warrior II Exercises at Ft Folk to train "aircrew, airborne forward air controllers (FACs), tactical air control parties (TACPs), joint terminal attack controllers (JTACs) and brigade combat teams"[7] must be conducted with much more frequency and should include elements from the entire theater air-ground system to include the CAOC, ASOG, AWACS and JSTARS. More such training incorporating joint operations in the urban environment is also needed.[8] Additionally, joint exercise should also focus on including unmanned aerial vehicles, opening and closing various airspace control measures, handing aircraft between various control agencies and practicing communication and data link connectivity.

Rebecca Grant, an analyst with RAND, explained the success of Fallujah as due to "Improved consistency and training, plus better connections with higher command centers, now kept the flow of air support running smoothly even with multiple teams on the ground. Joint assets--Navy carrier-launched aircraft and land-based Marine Corps

aircraft as well as Air Force aircraft--supplied the stacks."[9] General Buchanan, the combined force air component commander, noted some key lessons learned in Fallujah. One is that more aircraft need to be stacked up over top, so those aircraft waiting can get "eyes on" and can drop in right away when needed.[10] Joint training is required in order for this capability to become reality.

Conclusion 4

The services should work on establishing joint standards for communications equipment, common graphics, terminology and systems that can seamlessly connect and communicate with each other.

The 4th Infantry Division is an excellent example of the services overcoming shortfalls in common computer systems occurred in 2003 and early 2004. 4th Infantry Divisions Fire Support Element established restricted operating zones (ROZs) by manually translating information from their advance field artillery tactical data system (AFATDS). These restricted operating zones were then placed in the airspace control order so that airspace users, both fixed and rotary wing, could avoid the restricted operating zone and avoid being hit by friendly indirect fire. "Each artillery ROZ on the ACO had a point of contact (POC) from the FSE that established the ROZ, so aircraft that needed to fly into the ROZ could coordinate with the FSE. This allowed for the safe delivery of fires and cleared airspace. When ROZs overlapped with Class D airspace near airfields, the FSEs communicated with the aircraft control towers."[11] This process is a possible long term solution, but joint systems must be in place to allow computer systems to talk to each other and make the opening and closing of required artillery restricted operating zones instantaneously accessible to various joint command and control

platforms. Additionally, restricted operating zones are temporary airspace control measures; therefore they should be active only when in use and not used as a means for units to retain control of an airspace sector. Finally, there should be a single point of contact for all restricted operating zones in the area of operations and a published frequency for aircraft to call to find out the status of a particular restricted operating zone.

Col Waring, a previous commander of the 19th Battlefield Coordination Detachment during 2004-2005, also recommends that company level graphics be integrated at the joint level so that the situational awareness of pilots is increased by having these graphics make it into the cockpit.[12] We need to overcome our own service biases and learn more about the functions of other services. Such action would lead to better joint integration.

"Future systems such as the Single Integrated Air Picture (SIAP), Joint Mission Planning System (JMPS), Joint Airspace Management and Deconfliction (JASMAD), must be correlated with current systems such as the tactical digital information links (TADIL) and various radar systems so the JFACC can see where every aircraft is and where it is planning to go or the area in which it will be operating. The goal must be to require each and every platform flying in the battlespace to provide the same level of information."[13]

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[7]Newberry.

[8]Ibid.

[9]Rebecca Grant, "The Fallujah Model," *Air Force Magazine*, February 2005, 52 [magazine on-line]; available from http://www.afa.org/magazine/Feb2005/0205 fallujah.pdf; Internet; accessed 18 January 2007.

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